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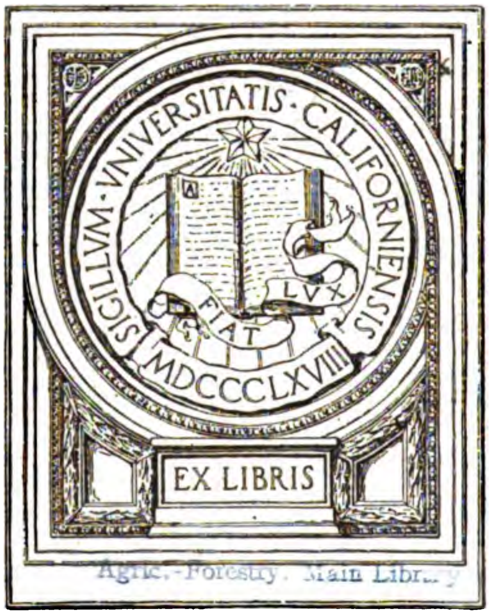

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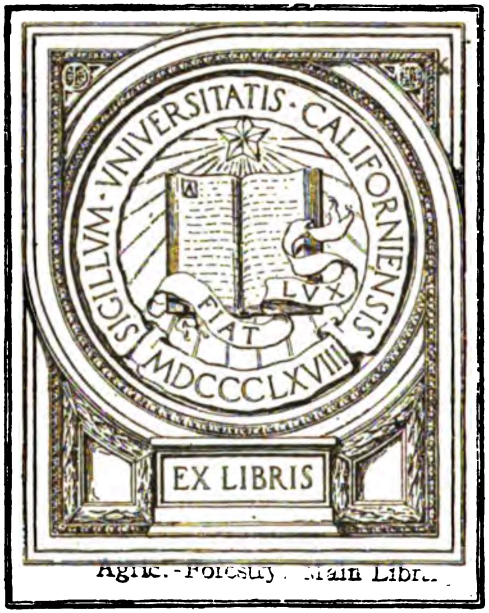

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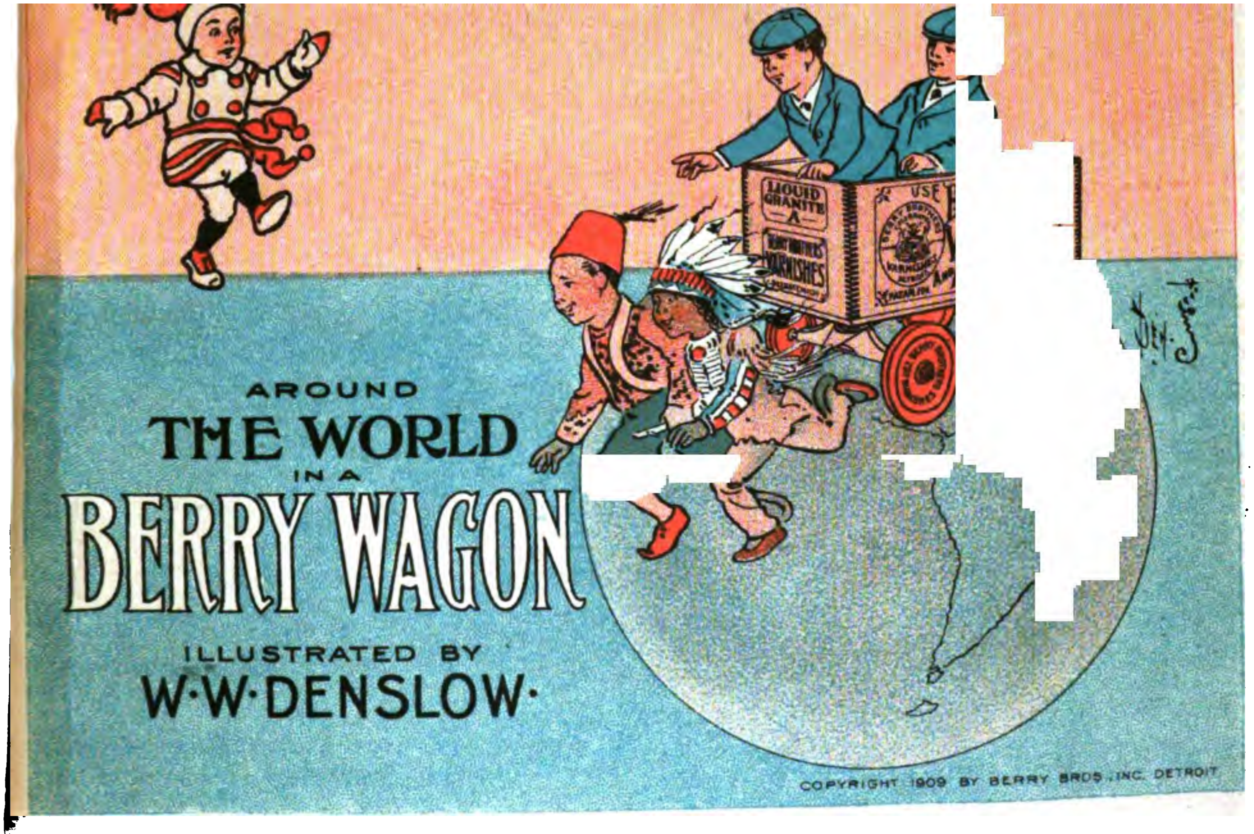

AROUND
THE WORLD
IN A
BERRY WAGON

ILLUSTRATED BY
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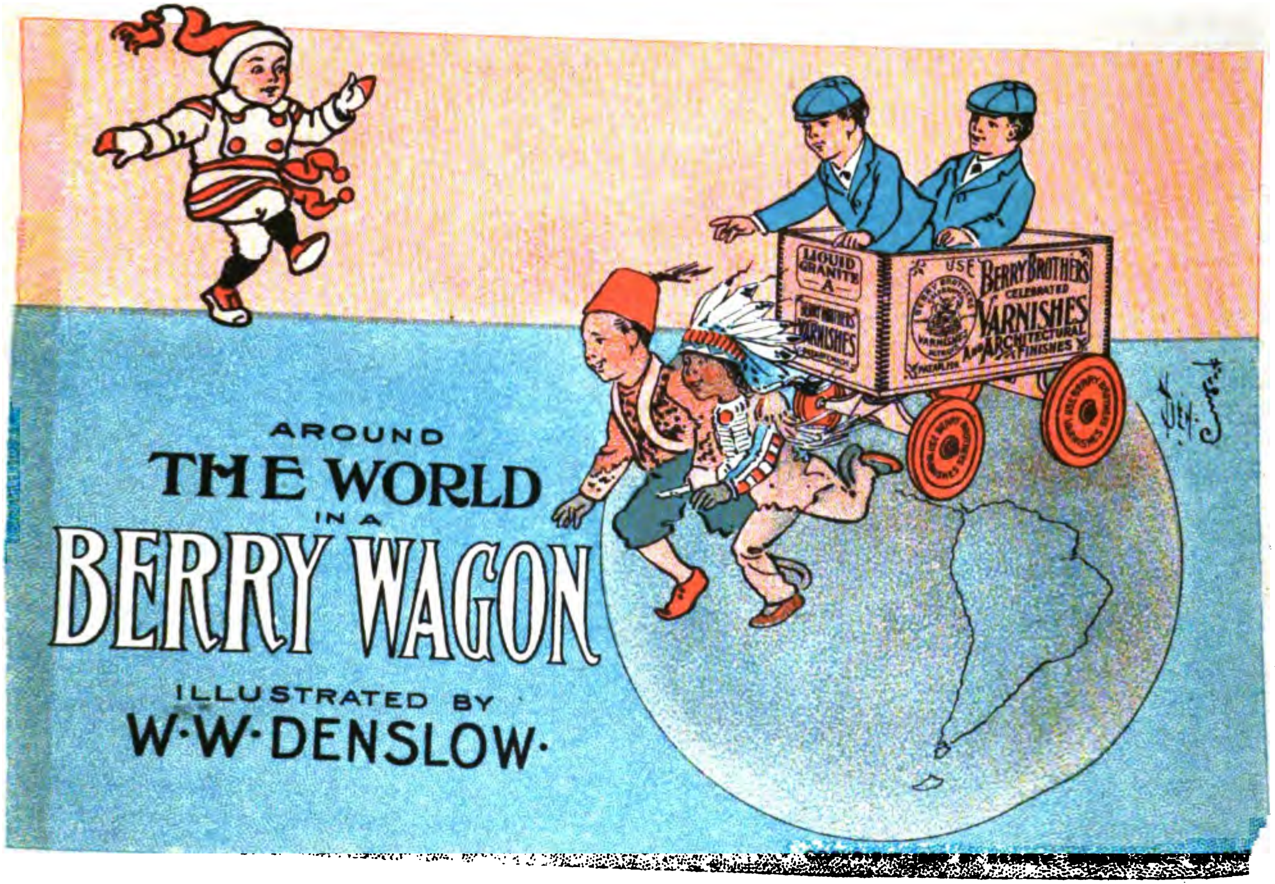
LIQUID GRANITE A
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES

AROUND
THE WORLD
IN A
BERRY WAGON

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DETROIT, MICHIGAN
WALKERVILLE, ONTARIO

To our little friends all around the world this book is affectionately dedicated.

We have aimed to make it so instructive, entertaining and beautiful that when you grow to be men and women you will think of us.

BERRY BROTHERS, Incorporated

DETROIT, U. S. A.

IN DETROIT
"Life is worth living"

WALKERVILLE, ONT.

364023

UNIV. OF
CALIFORNIA

DETROIT. The name of the beautiful city is from *d'etroit*, (French for strait) or the narrowing of lakes known as the Detroit River. Detroit is the seventh city in order of size in the United States. It is the metropolis of Michigan, the fourth of the Great Lake cities, and second in importance as a border port. Its present population is about 500,000.

When visited by Frenchmen, in 1610, there was an Indian village where this city now stands. Cadillac built Fort Pontchartrain here in 1701, and a frontier French village quickly sprang up. The English Colonel, Robert Rodgers, took possession in 1760, and heroically held it against the attacks of Indians under Pontiac, in 1763 and 1764. Fifteen years later Fort Lernault was erected. Detroit was the northwestern headquarters of the British forces all through the Revolution. Though ceded to the Americans in 1783, they did not take possession till 1796, when its name was changed to Fort Selby.

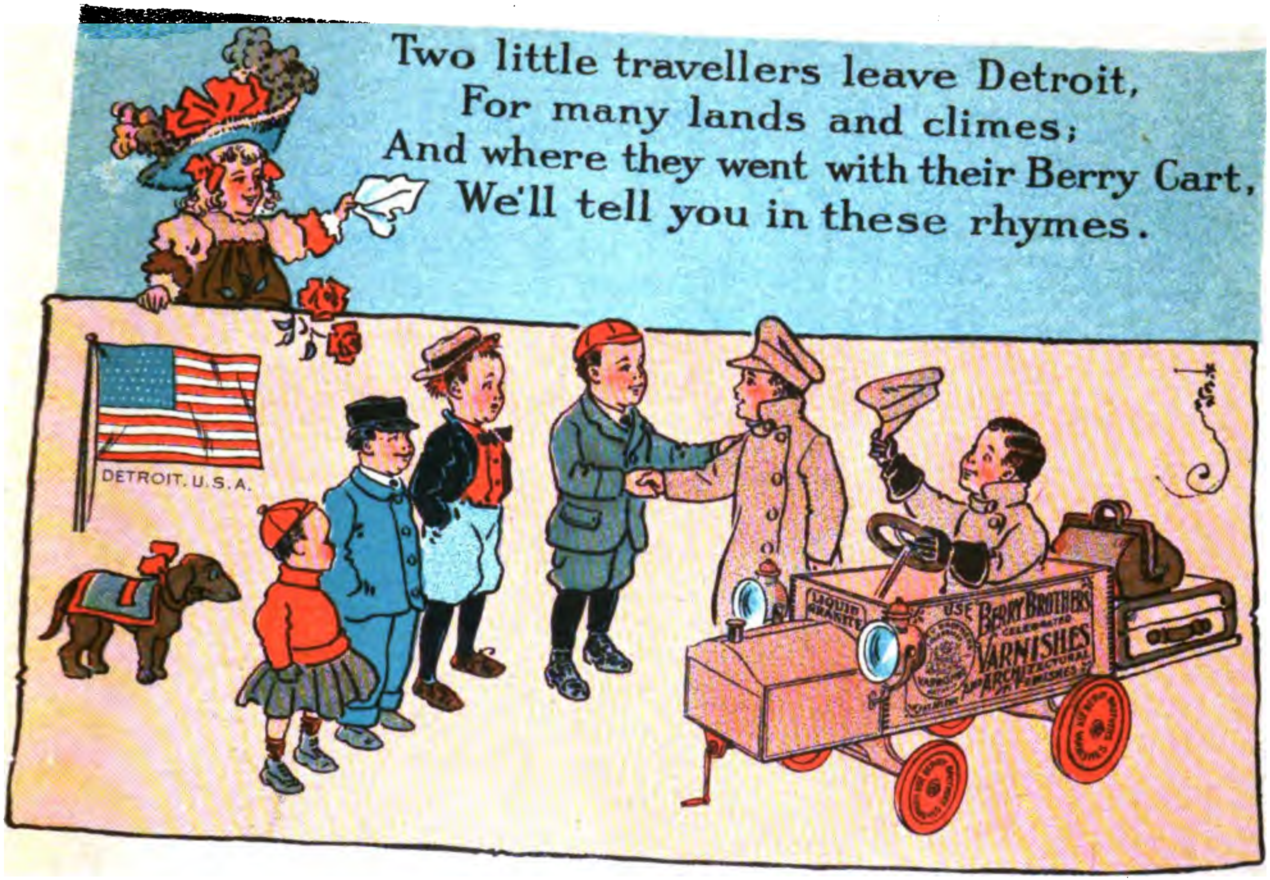
Incorporated in 1802, Detroit was destroyed by fire in 1805. The fort was surrendered to the English in 1812, but the Americans took it back the next year. The town was the capital of the Northwest Territory from 1805 to 1837, and of Michigan until 1847. Detroit was chartered, as a city, in 1824.

As a city Detroit is very fortunately placed along the river, which is called "the Dardanelles of America." A greater number of ships and more freight pass through Detroit River than through any other stream in the world. This river affords the finest harbor of all the Great Lakes.

The superb surrounding scenery and the beautiful river islands combine in making Detroit one of the loveliest cities of the world. From its famous Belle Isle extends its famous park system. The city itself is handsomely laid out, with wide, well-shaded avenues. It has a perfect system of drainage and nearly 200 miles of street railway tracks. The Michigan metropolis has become the center of a great system of railroads extending through the United States and Canada.

Detroit's first manufacture is varnish, the factory of Berry Brothers, Incorporated, being the largest and best equipped in the world. It also has a heavy American and Canadian trade in grain, wool, copper, pork, etc.

The history of Detroit has been most romantic. Claimed by sovereigns of three nations at one time, it was twice besieged by Indians, once captured in war, once consumed by fire, once surrendered. It has been the scene of 50 pitched battles and 12 massacres.



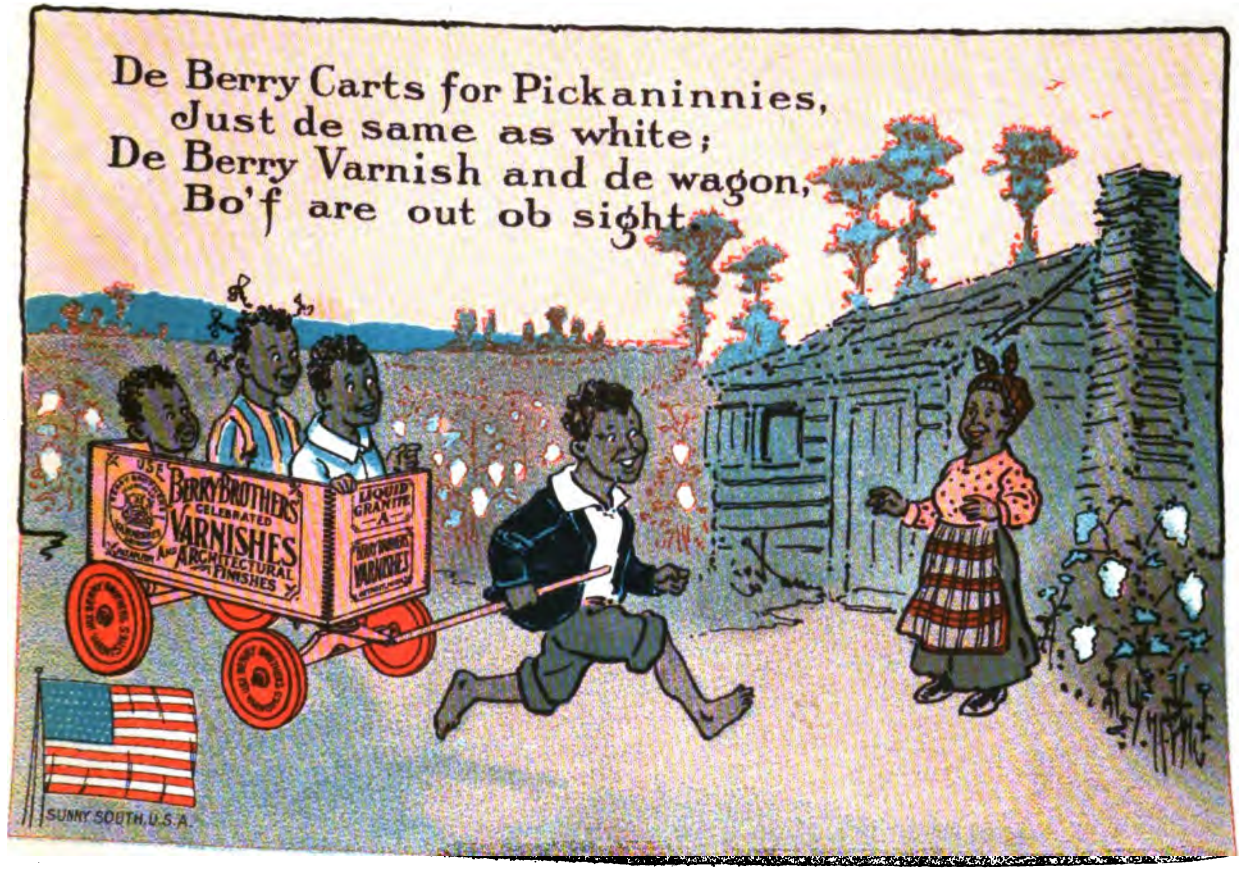
Two little travellers leave Detroit,
For many lands and climes;
And where they went with their Berry Cart,
We'll tell you in these rhymes.

DETROIT. U.S.A.
LIQUID GRANITE
USE BERRY BROTHERS CELEBRATED VARNISHES ARCHITECTURAL FINISHES

THE SUNNY SOUTH. It is interesting to note how much of United States history took place or was "made" in the Southern States, and by Southern people. Ponce de Leon searched for the "Fountain of Youth" in the Sunny Southland, and named Florida "The Land of Flowers." De Soto's discoveries were confined to the South. The oldest settlement in the United States was made at St. Augustine, Florida. The South was very prominent in the war of the Revolution and in the organization of the United States Government. Washington, Jefferson, Madison, Monroe, Jackson, Tyler, Taylor, Calhoun, Clay, and even Abraham Lincoln, were all men of Southern birth and antecedents.

World wide is the reputation of the "Sunny South," as the land of boundless hospitality, loyal friendship, genial comradeship and lovely women.

Nearly all the world's supply of cotton is furnished by the Southern States, and their manufacturing, industrial, and agricultural development has been very great during the last two decades. "Dixie" ranks in popularity with "Yankee Doodle" and "The Star Spangled Banner" all over the country as a national song.


De Berry Carts for Pickaninnies,
Just de same as white;
De Berry Varnish and de wagon,
Bo'f are out ob sight.
USE
BERRY BROTHERS'
CELEBRATED
VARNISHES
AND ARCHITECTURAL
FINISHES
LIQUID
GRANITE
A
BERRY BROTHERS
VARNISHES
SUNNY SOUTH, U.S.A.

MEXICO—(the United States of.) This name comes from the Aztec Mexitli, one of their ancient deities. The Aztecs were, in many ways, civilized when Cortez and his Spanish adventurers landed on Mexican shores, in 1519. The Spaniards rewarded the kindness and hospitality of the Aztecs with death, torture, cruelty and slavery in the very gold mines they, the Aztecs, had once owned, The native, pure-blooded Castilians became the aristocrats of the country, and through cruelty and slavery amassed vast fortunes. Finally Iturbide, "the Liberator," the George Washington of Mexico, rose up and the Mexican people threw off the heavy yoke of Spain, in 1821. A so-called "republic" was proclaimed by Santa Ana, at Vera Cruz, the next year. Texas was ceded in 1836, and the Mexicans went through the "Mexican War," with the United States, (1846-1848) before a real republic was founded, in 1855. A constitution was proclaimed two years later, but "the war of reform" between the people and the old established church continued three years, until 1860. Then through "French intervention," in 1861, an empire was set up, with Maximilian of Austria placed on the throne of Mexico. Through the great energy and popularity of Benito Juarez, an Indian statesman, the Mexican empire was overthrown, Maximilian was arrested, condemned for high treason, and shot in 1867. His young wife, Empress Carlotta, went insane, and was kept a prisoner in Europe for more than forty years after the tragic death of Maximilian. Juarez continued to be President of the Republic of Mexico until his death in 1872. Porfirio Diaz was elected President in 1877. He was succeeded by Gonsalez in 1880, was re-elected in 1884, resigned May 25, 1911. Senor De la Barra appointed provisional President, October 15, 1911. Gen. Francisco Madero installed November 6, 1911, arrested February 18, 1913, killed February 23, 1913, Huerta made provisional President of the Republic.

A lazy place is Mexico,
With lots of time to play;
For Burros never travel,
More than seven miles a day.

PERU, from Piruas, the name of the ancient people who lived in the Andes mountains even before the Incas, whom the Spaniards found in a high state of civilization. Little is known of the early history of the Incas, except from legends gathered by the first Spaniards there. In 1543 the Inca Yupanqui led an army south to what is now known as Chile. About 1516 the first white man appeared in this region. Pizarro, the Spanish adventurer and discoverer, invaded the land of the Incas in 1531, and conquered it in 1534. At Cuzco the Spanish invaders found an immense quantity of gold, which they melted into ingots to send back to Spain. Pizarro founded Lima (now the capital of Peru), which he first called "the City of the Kings." He was himself put to death, in 1548, by a rival Spaniard. Petty quarrels and rivalries make up the history of Peru, for two hundred years. The province of Quito separated from Peru, in 1718, and has since become Ecuador, and the territory now found in Argentina was detached seventy years later. Peru was the last of the Spanish provinces in South America to declare its independence, which it did in 1821 and established it three years later. Peru, Chile, Ecuador and Bolivia formed a defensive alliance against Spain in 1865, and peace was declared the next year. In 1879 Peru became involved with Bolivia in a war with Chile, to which country Peru was forced to yield some territory, in 1883, and was left in a shattered condition. Peace between these countries is continually threatened because of boundary disputes.

Chile has the strongest navy in South America, with as fine battleships as any in the world. Nearly all the guano used for fertilizing purposes throughout the world comes from this region. The Llama is the beast of burden in the Andes mountains. Bogota, high up in these mountains, with a population of 110,000, is the highest large city in the world. Chile was settled by the Irish. Our common white potato was discovered there and first sent to Ireland, hence the name, "Irish potatoes."

PERU
Across the Andes Mountains,
From Bahia to Callao;
You will find the Berry Wagon
No matter where you go.
USE
BERRY BROTHERS
CELEBRATED
VARNISHES
AND ARCHITECTURAL
FINISHES

CANADA, from *Kanada*, (Iroquois for "cabins") was claimed by Great Britain because old John Cabot first sighted Nova Scotia in 1497. Bluff Jacques Cartier sailed up the St. Lawrence in 1534. Sieur de Monts made a permanent French settlement, at Port Royal, in 1604, naming the country New France.

Quebec was settled on the site of the Indian town of Stadacona, at the foot of the steep cliffs, in 1608. Montreal took the place of the village of Hochelaga on a wooded island which was named Mount Royal.

The English and French fought for the mastery, the English claiming the country "by right of discovery," and the French "by right of possession." The British finally captured Quebec, in 1759, after one of the most heroic contests in all history. Montcalm, the brave French defender of the city, lost his life just in time, he said, "*not* to see the surrender of Quebec." Wolfe the valiant conqueror, already ill and thrice wounded, said he "died content," in the hour of his victory. Upper and Lower Canada were then ceded to England by the Treaty of Paris.

The French were discontented under the British rule, and revolted in 1837, but were soon reunited. On July 1st, "Dominion Day," 1867, Ontario, Quebec, New Brunswick, Nova Scotia, Manitoba, and Northwest Territory were united into one grand confederation called the *Dominion of Canada*, with capital at Ottawa. The Fenian raids and two "Riel Rebellions" (in the Northwest) were the only disturbances of the uniform peace of Canada. British Columbia joined the Dominion in 1871, and Prince Edward Island, two years later. (Newfoundland still holds aloof.) The vast Northwest Territory and Hudson Bay region have been divided into seven great provinces and added to the Dominion. The discovery of gold in the Klondike, in 1896, made Yukon Territory a new Eldorado.

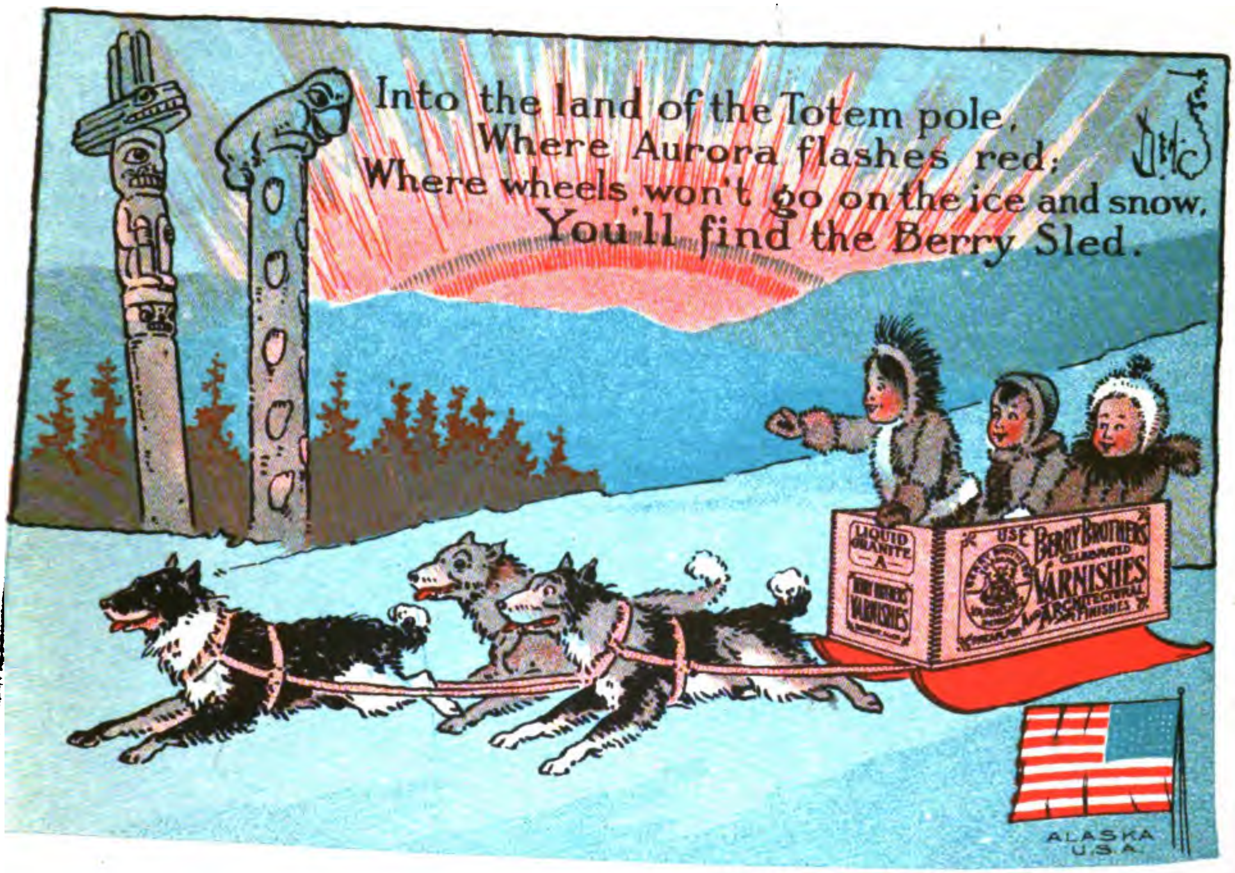
The plains of Western Canada are now among the world's greatest wheat fields. The marvelous development of her unlimited resources is making Canada the Land of the XXth century. The Canadian Pacific Railway, opened in 1886, belts the Continent from Nova Scotia to the Pacific Coast, following Canada's "Star of Empire" across the country of the Maple leaf—the land of Romance and Progress in the Western Hemisphere.

They traveled all through Canada,
The welcome there was hearty;
The children of the "Maple Leaf"
Thought them a jolly party.

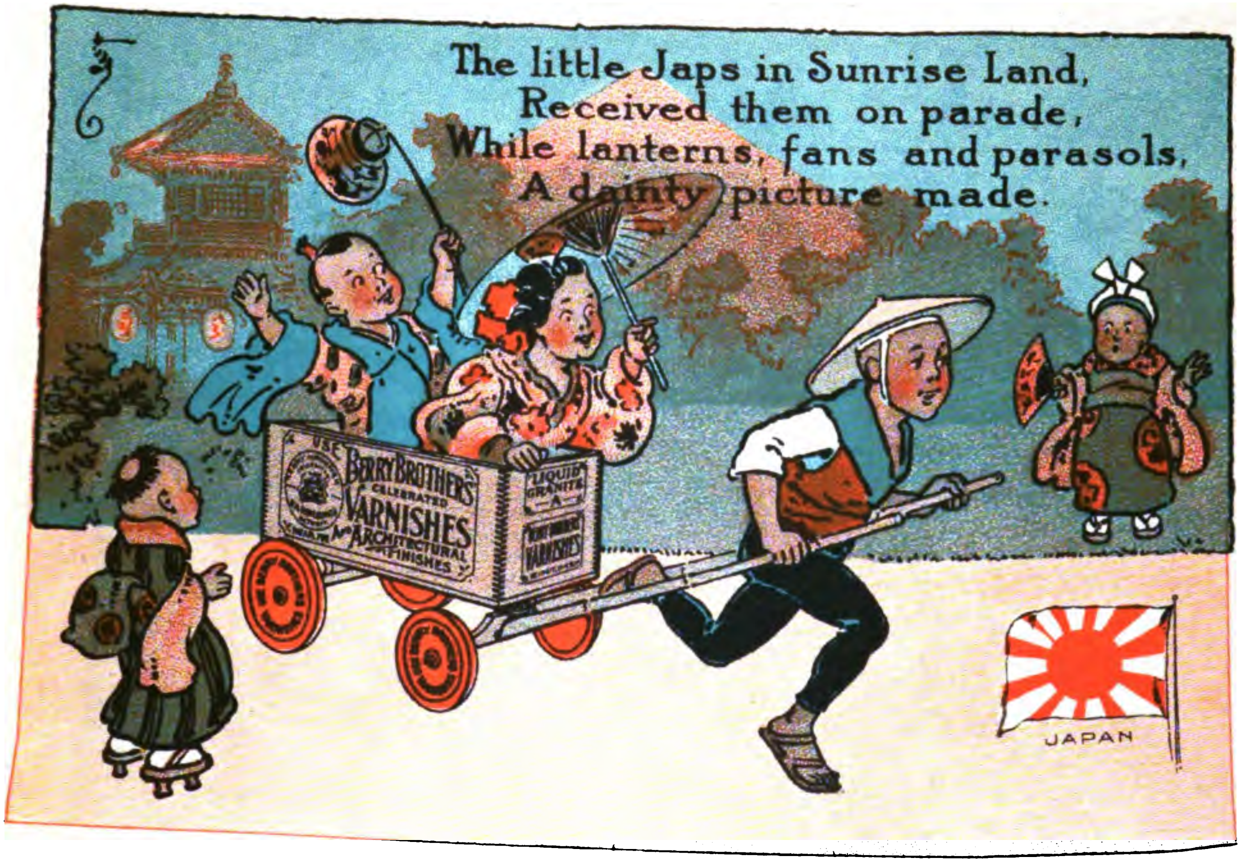
LIQUID GRANITE
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
CANADA

ALASKA. In 1740, Bering, a Danish navigator in the service of Russia, discovered a group of islands here and gave his name to Bering Sea and Bering Strait. The coast of Russian America, as it used to be called, was visited in 1778 by the famous Captain Cook and about the same time by the Spaniards. That year, also, the Russians formed a company to exploit the new Russian possessions in America. In 1784 a permanent settlement was made in that newly-discovered region. In 1799 the Russian American Company was chartered to control all Russian interests in America for twenty years, and a trading post was established the same year, at Sitka. The Western Union Telegraph Co. sent explorers, who worked three years (1864) to try to connect northwestern America with northeastern Asia by stretching wires across Bering Strait. But the laying of a cable on the bottom of the Atlantic Ocean connected America and Europe, so the Western Union Co. gave up their project in Alaska.

In March, 1867, Russia sold Russian America to the United States for $7,200,000.00 in gold, the negotiations being conducted by Secretary of State Wm. H. Seward, and in October, that year, a United States military force took possession of Sitka. The new United States territory was called Alaska. Missionaries of the Greek Church, of Russia, and from the United States have worked long and well to convert and improve the condition of the Alaskan Indians, who make beautiful Trinket baskets, and revere hideous carved high posts called "totem poles." Bering Sea, being claimed as inland water by the United States and Russia, the United States several times seized British vessels while fishing and catching seal, and this led to a long dispute between this country and Great Britain. The beautiful fur seal were nearly all killed (making sealskins more expensive than ever), when gold was discovered in Alaska and the Klondike region in 1897, and at Cape Nome, two years later. The vast importance of the Klondike region brought the boundary dispute between the United States and Canada to a better understanding.


Into the land of the Totem pole,
Where Aurora flashes red;
Where wheels won't go on the ice and snow,
You'll find the Berry Sled.
LIQUID GRANITE A
BERRY BROTHERS' VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES ARCHITECTURAL FINISHES
ALASKA U.S.A.

JAPAN is called Nippon by the Japanese. They claim that their history began about the year 660 B. C. The real history of Japan begins about 550 A. D., when Buddhist missionaries from Corea brought Chinese letters, writing, calendars and methods of keeping time. Buddhism was the official religion of Japan in 621 A. D. About this time the government was changed to a kingdom. There were two tribes of soldiers: the Taira, with a white crest, and the Minamoto, with a red. These began, in 1159, to quarrel, and then followed wars, like the "Wars of the Roses" in England. The Taira were all killed by the Minamoto under the leadership of Yoritomo, who, as the first powerful Shogun, stole the Mikado's power in 1192. A system of feudal barons grew up. The Mikados were the emperors, but the real power belonged to the Shoguns. These remained in power until 1573, during which time the Portuguese entered Japan, bringing Bibles and guns. The Shoguns rule was one of great refinement in manners, high art and literary culture. The Buddhists, whose monasteries were forts, often turned the scale of power. The Portuguese traded with Japan from 1543 till 1638. The native Christians were persecuted after 1624. The Tokugawa dynasty of Shoguns began in 1603. Japan had little trade until the American, Commodore Perry, negotiated a treaty in 1854, and four years later Japan was opened to the world. In 1860 the Japanese embassy visited America. The shogunate was done away with in 1867 and civil war ended the following year, with the Mikado in full power once more. The feudal system was abolished in 1871; the Satsuma rebellion was quelled in 1877. The Constitution was proclaimed in 1889, and the first parliament convened in 1890. The war with China, in 1894-5, resulted in the defeat of the Chinese and the yielding of Formosa to Japan. In their war with Russia the Japanese were victorious and the articles of peace were signed in Portsmouth, New Hampshire, U. S. A. President Roosevelt had great influence in bringing about peace between Japan and Russia.



The little Japs in Sunrise Land,
Received them on parade,
While lanterns, fans and parasols,
A dainty picture made.

BERRY BROTHERS' CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
LIQUID GRANITE
BERRY BROTHERS VARNISHES
JAPAN

CHINA. Chinese history began as early as 1122 B. C. Fu-hi (2852 B. C.) is considered the founder of the Chinese social order. Yao, who was like Alfred the Great of England, and Shun (2357-2208 B. C.) were praised by Confucius as models of virtue and wisdom. The feudal system and fine arts grew and developed from 1122-1255 B. C., when the Chinese stopped wandering about and settled down to farming. Then the people became wealthy and idle. Then Confucius was born, 551 B. C. Confucius, Laocius and Mencius lived within a century or two of one another. In 255 B. C. began the dynasty of Chin from which comes the name China. Order was restored, the feudal system abolished and the Great Wall of China was built. Prince Cheng of the House of Chin was the first universal emperor. He ruled with a rod of iron, burned all books and beheaded the scholars. During the next dynasty Buddhism was introduced; ink and paper were invented; libraries established, and civil service examinations adopted, making social rank depend on scholarship. The Empire was extended to the Caspian Sea, and the Imperial Academy was founded. The art of printing gave this golden age a great start. Commerce with Rome, Egypt, Japan and the East Indies made the years 960 to 1126 the most brilliant and prosperous age of China. Jenghis Khan overran northern China in 1215, and Mongolian rule was established by Kublai Khan in 1280. The Ming dynasty followed in 1368. Passports, paper money and grand canals were first used during this period. In the 16th century the Portuguese obtained a foothold and Russia came in contact with China. In 1643 the Manchus founded the present Tsing dynasty, and forced the people to wear the "pigtail." In 1662-1722 the great dictionary of the Chinese language was begun. The United States entered the Chinese field in 1785. The Opium War with England, a treaty with United States, Taip'ing Rebellion, and the Burlingame Treaty, 1869, followed in rapid succession. In the War with Japan, 1894-95, China was defeated. The Boxer Rebellion and the siege of Pekin occurred in 1900. Emperor Kuang-Hsu and Dowager Empress Tsi-An died in November, 1908, and were succeeded by the infant Emperor Pu-Yi with Prince Chun as Regent. The Emperor Pu-Yi died in 1909.

The little Chinese boys and girls,
From the big world set apart,
Were never really happy,
Till they found the Berry Cart.
CHINA
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
LIQUID GRANITE
BERRY BROTHERS VARNISHES

AUSTRALIA, meaning "Southland," was at first called New Holland, because the first continuous discoverers of that "island continent" were from Holland. Portugese navigators first touched the shores of Australia, and the French were the first to map out their discoveries there. But the first real voyage of discovery was made by a Dutch captain in 1606, in the yacht Duyften, or Dove. Many bays, capes and "lands" around Australia still bear the names of the Dutch discoverers or their ships. A captain from Batavia, named Tasman, called the southern island of Australia Van Diemen's Land, for the father of the girl he loved. But the island is now named Tasmania, in honor of the discoverer himself.

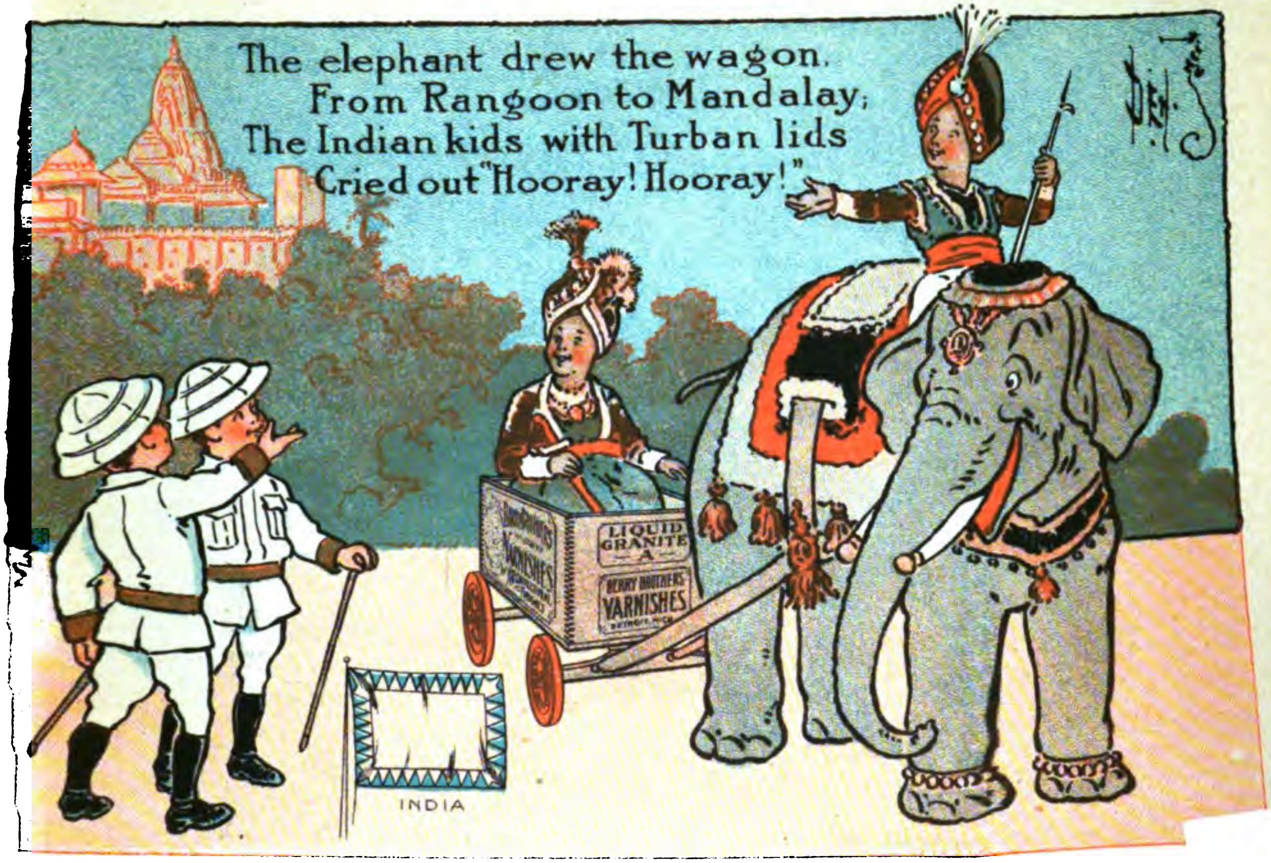
Captain James Cook, commanding the Endeavour, (from which Endeavour Strait was named) once anchored in a bay, beside which the great city of Sydney now stands, where he saw so many botanical specimens then unknown to science that he named the region Botany Bay. This place became a place of exile, like the Siberian mines, for criminals, and a penal colony was established there in 1788, the first settlement being made at Port Jackson that year. Some convicts on their way "out" from England composed the following lines about themselves:

"True patriots we, for, be it understood,
We leave our country for our country's good!"

Because the southeastern coasts reminded Captain Cook of Wales, he named that region New South Wales. The English slowly extended their settlements from the coasts inland. In 1813 Philip Wentworth made a successful expedition along the east coast over the Blue Mountains inland. These discoveries and settlements went on for fifty years. The five Australian colonies of Great Britain: Victoria, New South Wales, Queensland, Western Australia and South Australia and the island of Tasmania, united to form a grand Federation under the name of the Commonwealth of Australia, January 1st, 1901. Melbourne and Sydney are the largest cities of Australia.

On the other side of the great big world,
In the land of the Kangaroo,
You can always find the Berry Cart,
And Liquid Granite too.
AUSTRALIA
LIQUID GRANITE
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES

INDIA is named from the river Indus. Its early "history" is legendary, and is made up chiefly of the Indian war fables. The earliest historic date is 557 B. C., the year of Buddha. Europeans first came to India through the invasion of Alexander the Great, 327 to 325 B. C. Sandracottus was then the Hindu monarch. Asoka was the king who did much to spread the Buddhist religion in the 3d Century. After a number of weak kings came the barbarous Scythians, who invaded India about 100 B. C. Then the Huns came and broke the Hindu power. The reign of Vikramaditya, in the 5th Century, was the grandest age of India, marked by the Sanskrit influence and the most general belief in Buddhism. This belief yielded to Brahmanism about the year 600 A. D. Then the Hindu power gradually gave way to Mohammedan rule, which was established from 1001 to 1186. In 1398 Tamerlane sacked Delhi and became emperor. Vasco da Gama and the Portuguese entered India in 1498. Baber took Delhi in 1526, and became the first of the "Great Moguls." Among the Moguls were Shah Jehan who built the Taj Mahal at Agra (that beautiful and exquisite tomb to the memory of his wife). These Moguls fought and died for the great Koh-i-noor diamond (now in the British crown) and for the right to sit upon the famous Peacock Throne, incrusted with gems so that it glistened like peacock feathers. The East India Company was formed in 1600. The rivalry between the English and French in India reached its height in 1748. In 1756 the native Governor of Bengal captured Calcutta and threw English prisoners into the prison called the Black Hole. Lord Clive won his great victory in 1757. Warren Hastings was the first Governor-General, from 1774-85, and many famous men followed him. The Indian Mutiny occurred in 1857 and 1858. The government was transferred from the East India Company to the crown in 1858. Victoria was made Empress of India in 1877. Edward VII was crowned Emperor of India in 1901.



The elephant drew the wagon,
From Rangoon to Mandalay;
The Indian kids with Turban lids
Cried out "Hooray! Hooray!"

AFRICA. The story of Africa, or the "Dark Continent" as it is sometimes called, is a story of war and cruelty down to the present time, owing, probably, to the fact that its inhabitants are only just commencing to be civilized, excepting in Egypt, where they have been civilized for many centuries.

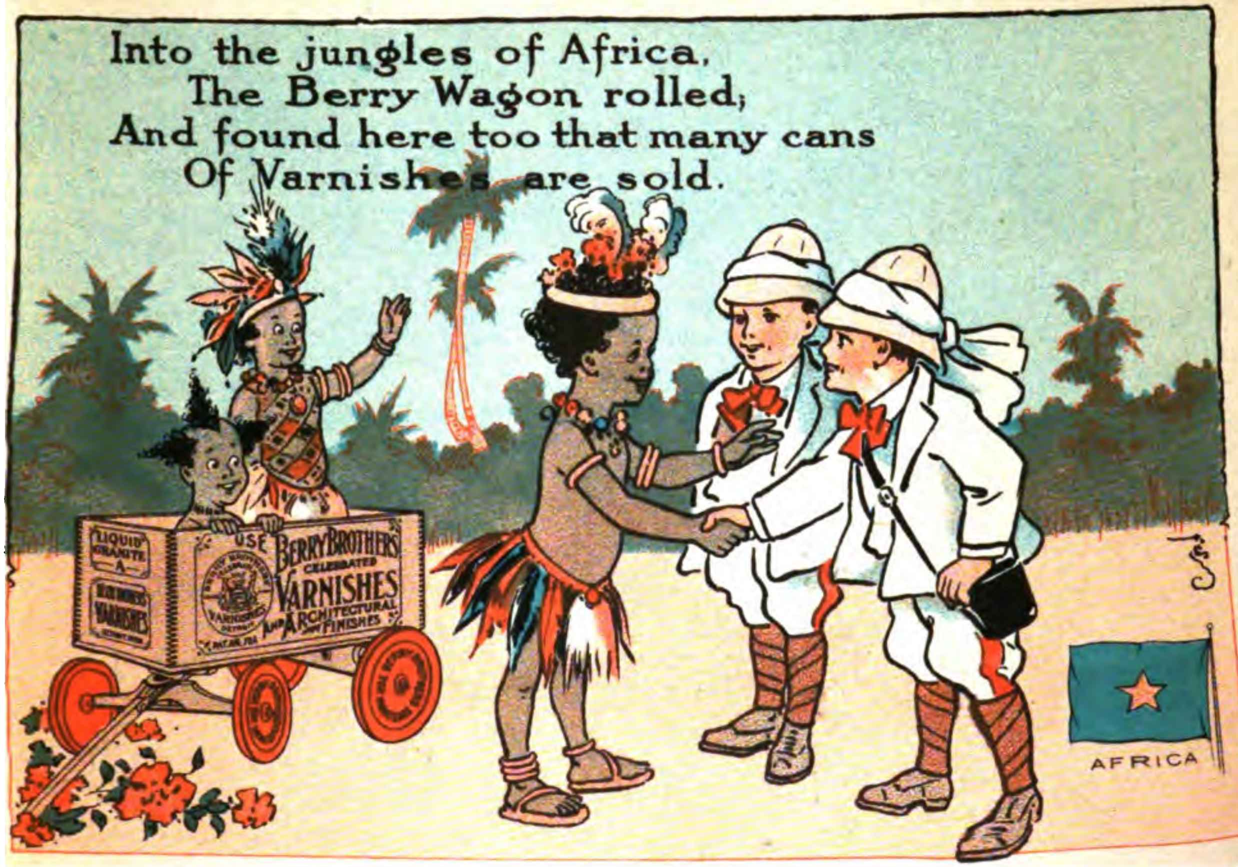
The coast line of Africa is 16,000 miles long, and this continent contains 11,400,000 square miles.

France owns more than one-third, the balance being controlled by Great Britain and Germany, in addition to the native and independent states. The population of Africa is estimated to be about 200,000,000 people.

Only the northern borders of the continent were known to the ancients, and this region was called Libya. Some Phoenicians, Herodotus says, sailed around the African continent about 600 B. C., and the Persians 100 years later, ventured out between, "the Pillars of Hercules" (Gibraltar) and down to the "Islands of the Blessed."

The Christian religion prevailed from the third to the fifth century, and after hundreds of years of fighting the Mohammedans drove the Christians out of Africa.

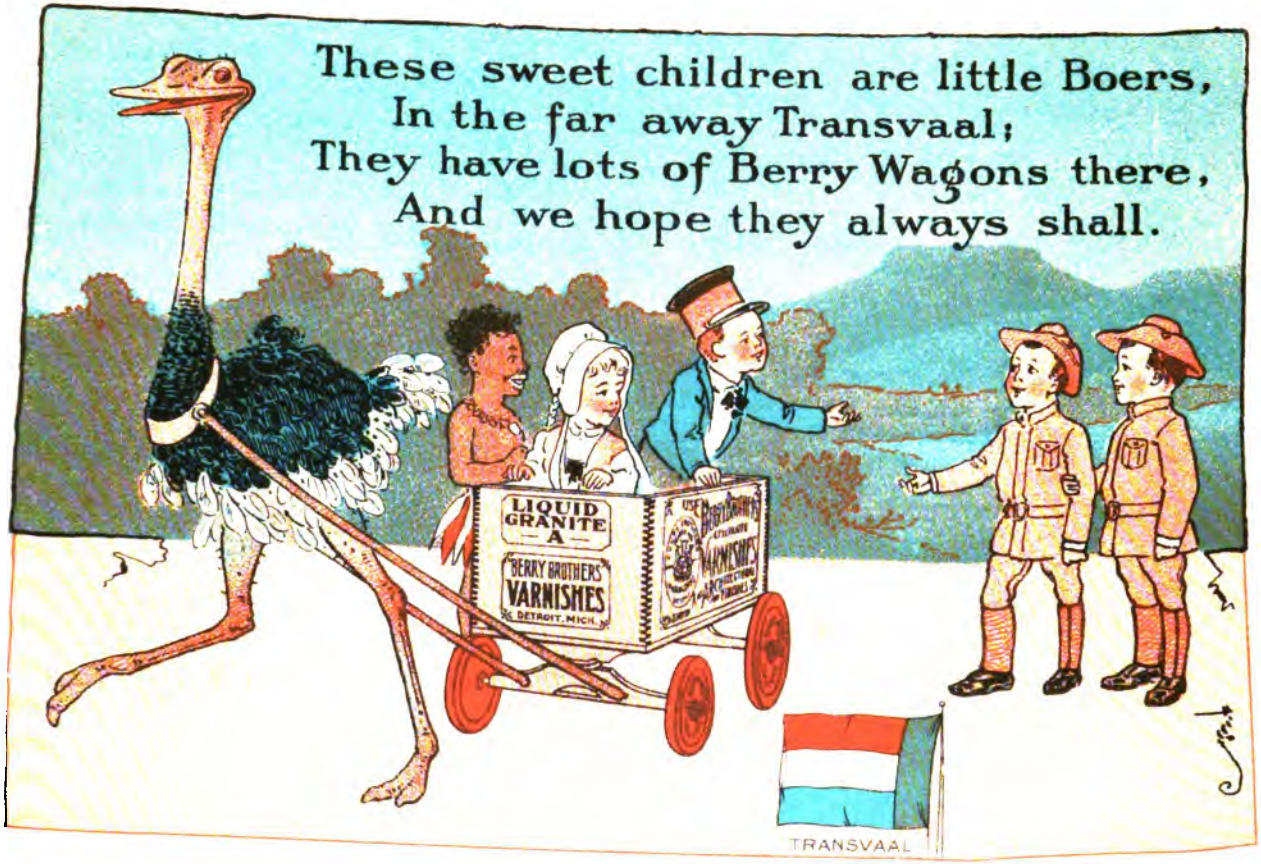
The Portuguese discovered the Cape of Good Hope in 1486. David Livingstone, a devoted Scotch missionary, entered South Africa in 1841, and in twenty years had worked his way through the "Unknown Regions," making known to the world the Zambezi River, with Victoria Falls, wider than Niagara and more than twice as high. He discovered Lake N'gami, Victoria, and Albert (Nyanza meaning "Lake") and the sources of the Nile. In 1865 Livingstone's men came out to the coast and told that their leader had been murdered. So the New York Herald, in 1870, fitted Henry M. Stanley out to hunt for Livingstone and he found him. Livingstone died in 1873. From '69 to '73 General Baker made several expeditions and suppressed the slave trade. The discovery of diamonds and gold in South Africa has hastened the development of that region. It was the eagerness of foreigners to get at the mines that brought about the Boer War.



Into the jungles of Africa,
The Berry Wagon rolled;
And found here too that many cans
Of Varnishes are sold.

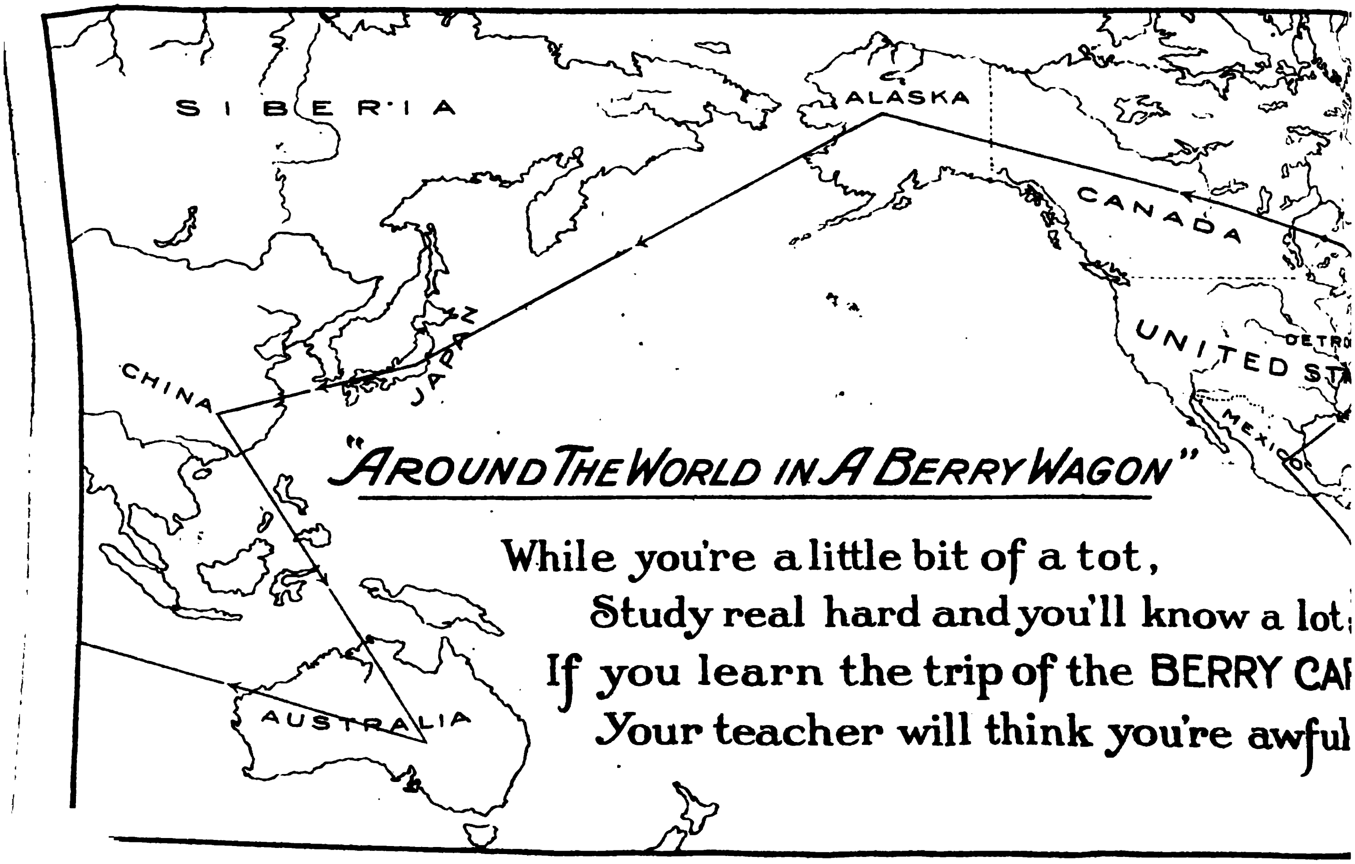
LIQUID GRANITE A
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
AFRICA

TRANSVAAL COLONY, formerly *South African Republic.* Founded by Boers, who originally emigrated from Holland. They were driven out of Cape Colony by what they regarded British encroachments, which ended in a law to free all slaves, in 1833. This was more than the Boers could stand, so they "trekked," or emigrated, and the British followed them wherever they went. They finally settled, in 1848, in the Transvaal, a plateau 6,000 feet above the sea, where January is the warmest and July the coldest month of the year. The British finally recognized the independence of the Transvaal republic in 1852. In 1877 a few discontented burghers called for British protection and the English commissioner assumed that this was a national appeal and declared the struggling young republic British territory. In 1880 the Boers revolted and fought heroically for their rights, giving the British at Majuba Hill, in 1881, the worst defeat the British soldiers had received in many a year. At a convention, held at Pretoria that year, peace was declared. But the people of the Transvaal resented the further encroachments of the British, who not only followed but surrounded the Boers. The discovery of gold, in 1884, caused new troubles to the Boers (who had emigrated several times just to be let alone) from a sudden influx of miners, promoters and adventurers from all over the world. Parties representing British and Boer and other "outlander's" interests complicated matters greatly. Dr. Jameson's raid, in the British interests, though unauthorized, involved Great Britain and the republic of Transvaal in the South African or Boer War, which lasted from 1899 to 1902, when the little Boer republic was forced to acknowledge British supremacy, and its old president, "Uncle" Paul Krueger, died in exile in Holland.



These sweet children are little Boers,
In the far away Transvaal;
They have lots of Berry Wagons there,
And we hope they always shall.

"AROUND THE WORLD I
STARTING AT DETROIT, THE ZIG-ZAG LINE S
← FOLLOW TH



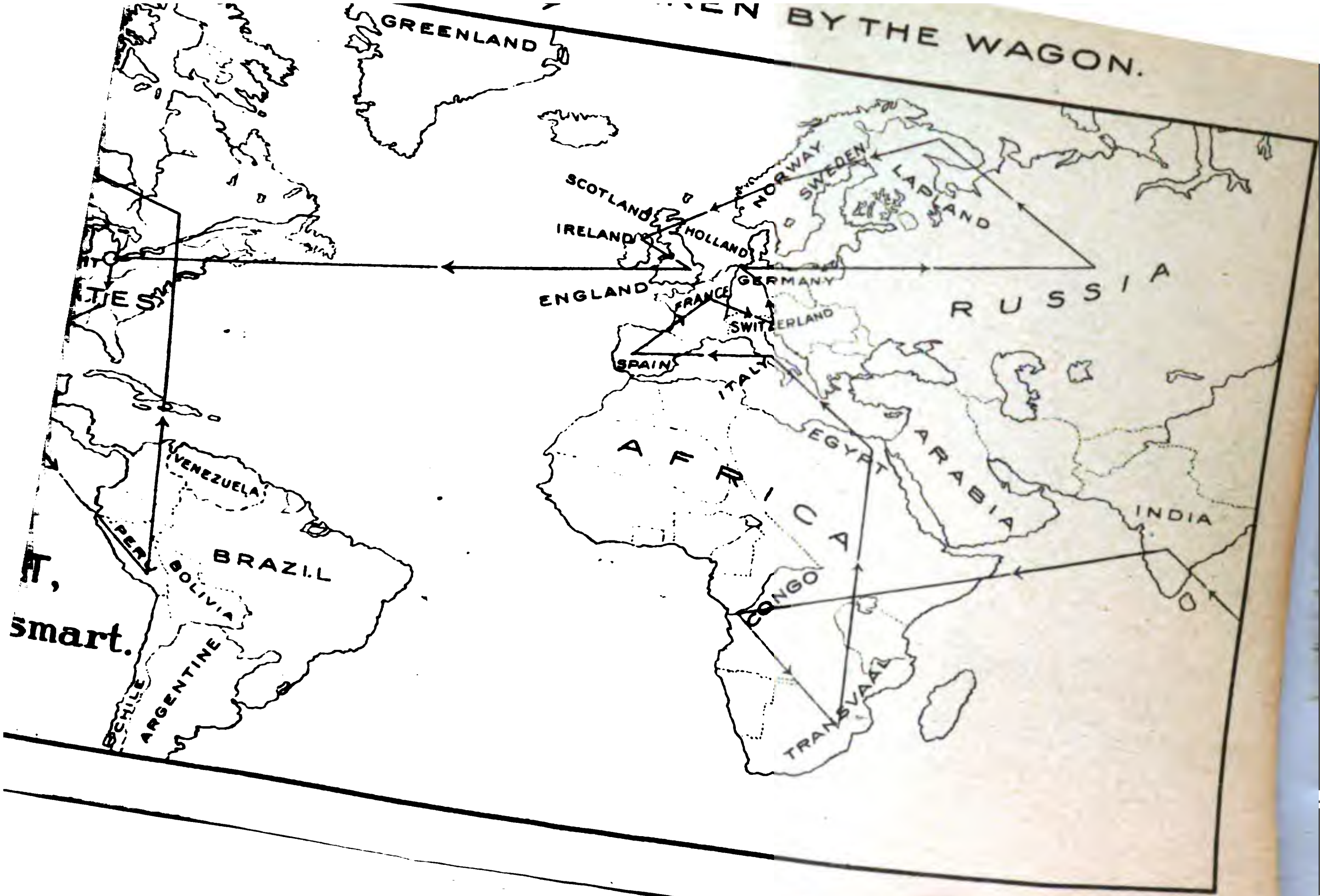
"AROUND THE WORLD IN A BERRY WAGON"

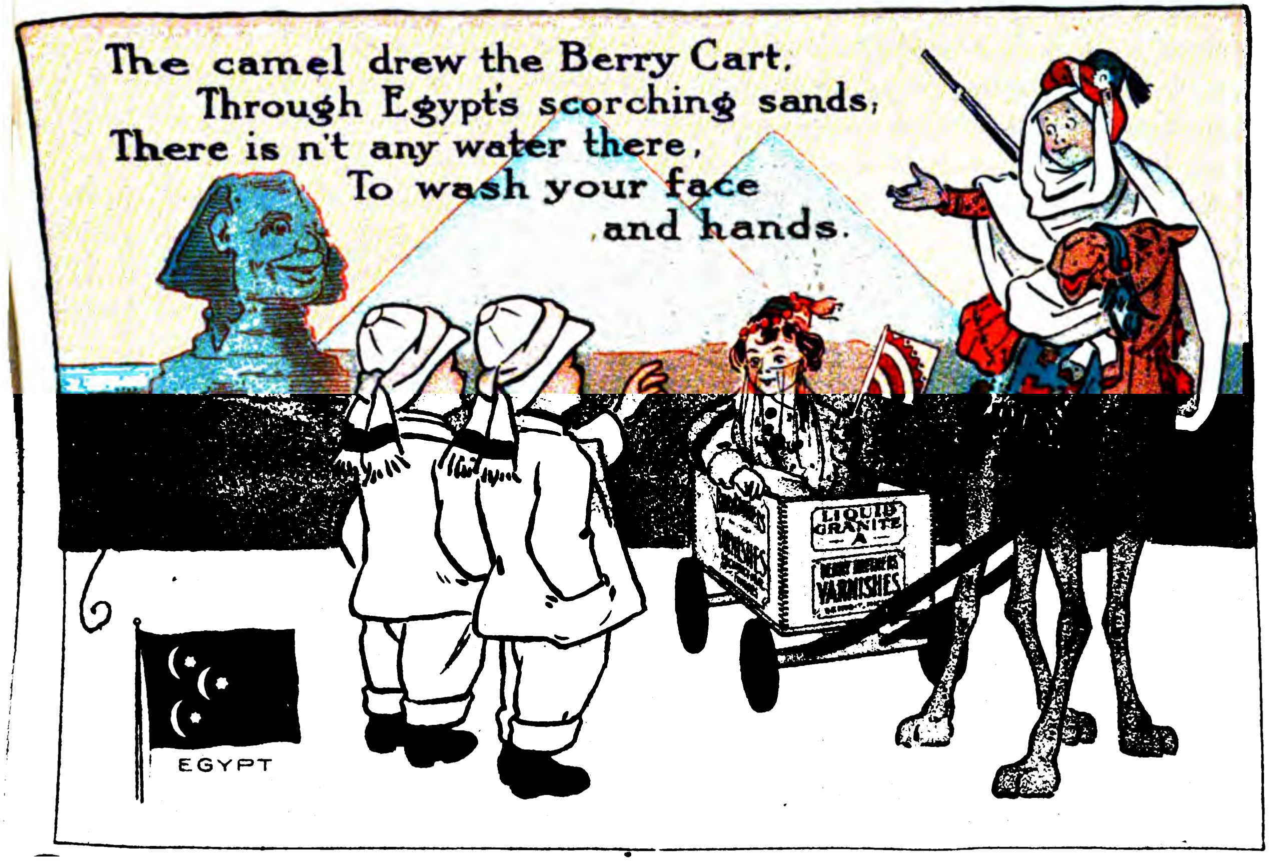
While you're a little bit of a tot,
Study real hard and you'll know a lot;
If you learn the trip of the BERRY CA
Your teacher will think you're awful

EN BY THE WAGON.

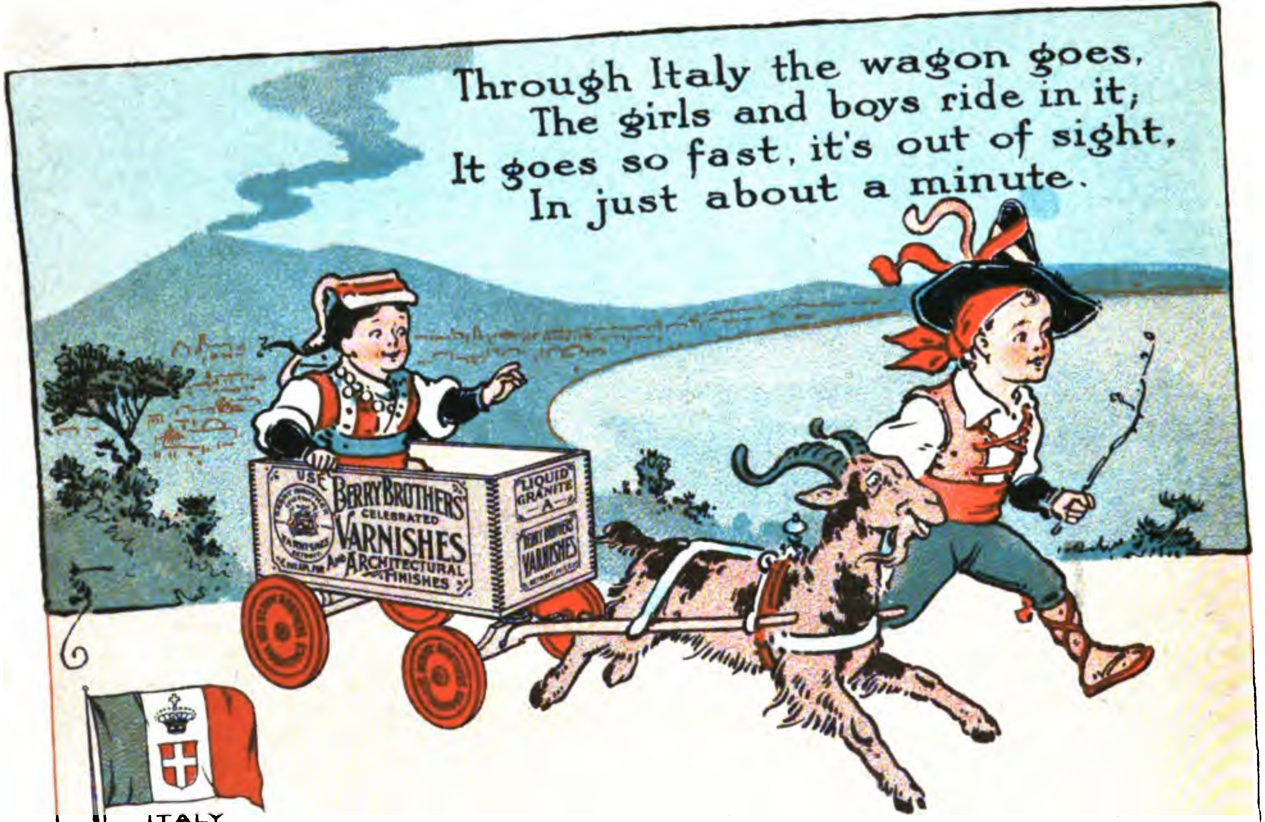
T,

smart.

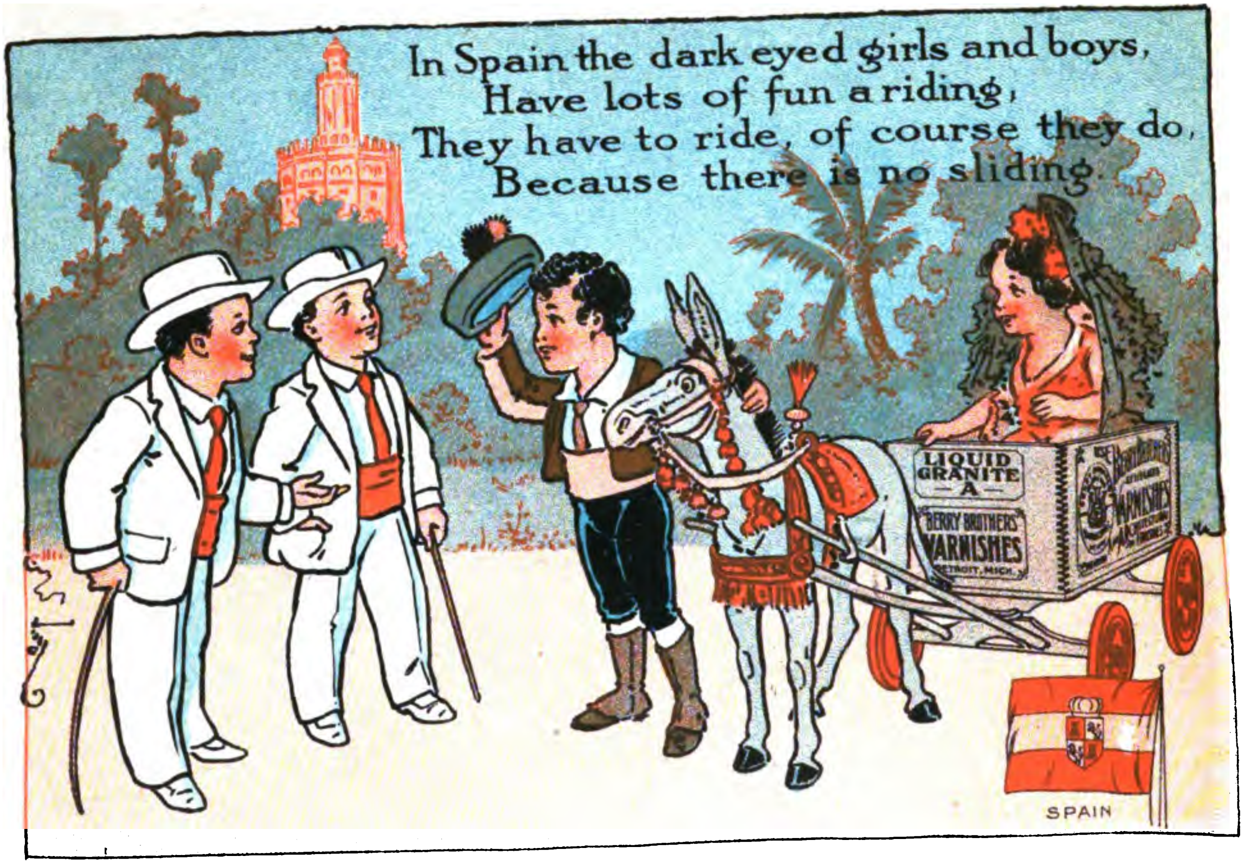




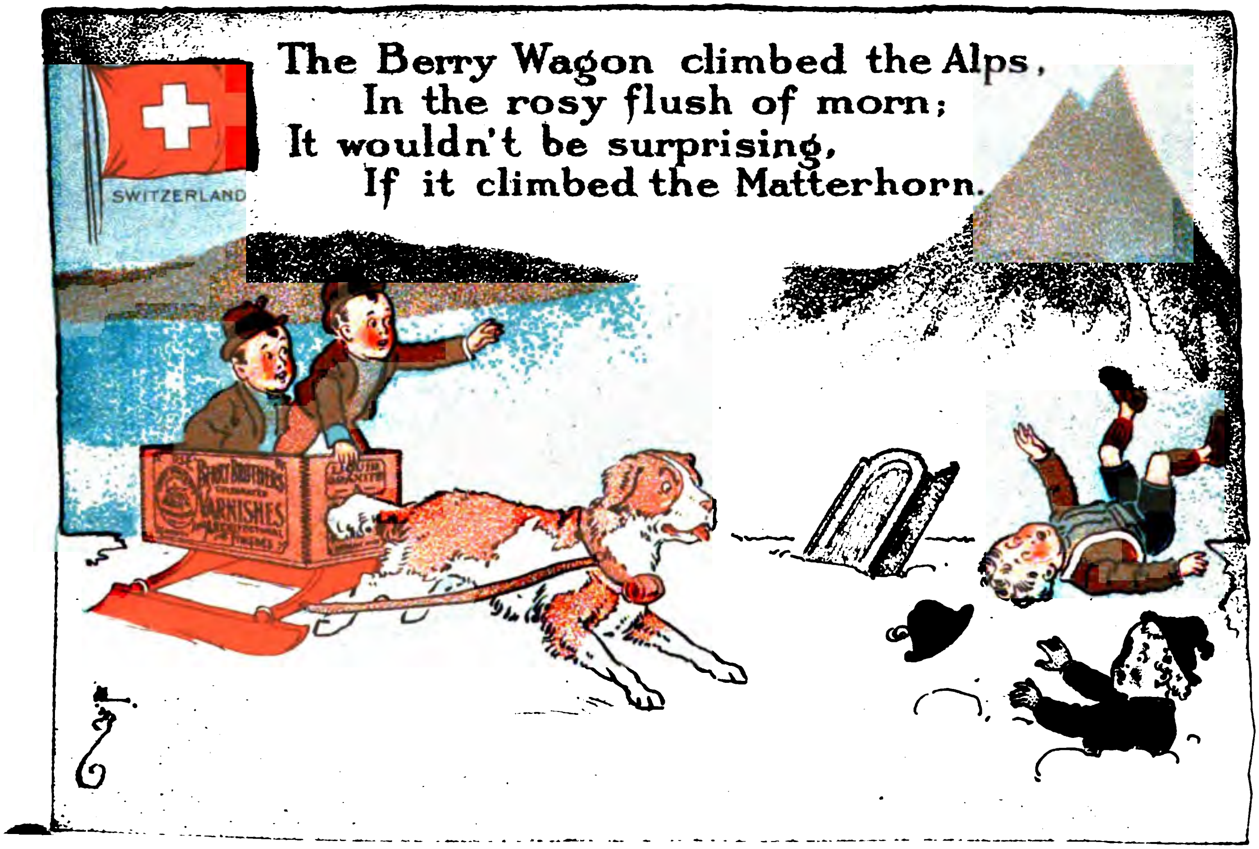
The camel drew the Berry Cart,
Through Egypt's scorching sands;
There is n't any water there,
To wash your face
and hands.



Through Italy the wagon goes,
The girls and boys ride in it;
It goes so fast, it's out of sight,
In just about a minute.

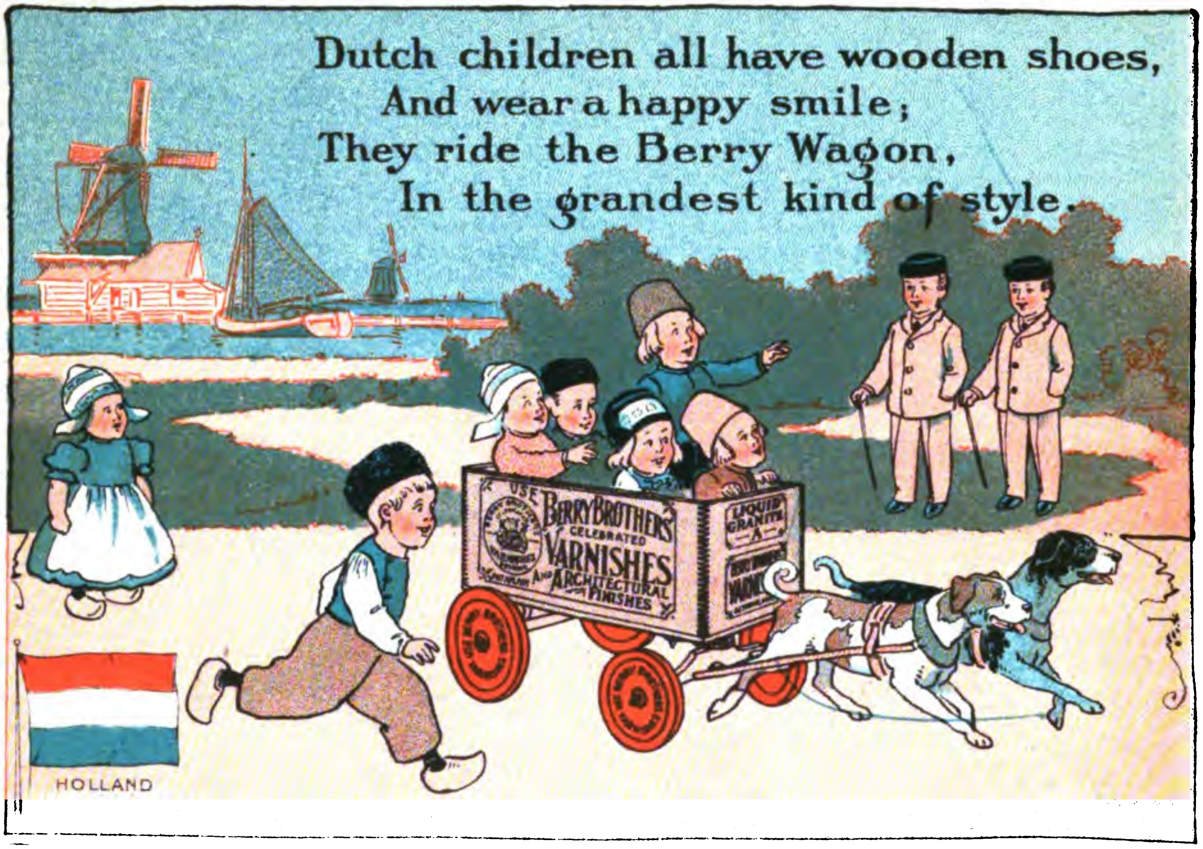

In Spain the dark eyed girls and boys,
Have lots of fun a riding,
They have to ride, of course they do,
Because there is no sliding.
LIQUID GRANITE A
BERRY BROTHERS VARNISHES DETROIT, MICH.
VARNISHES
SPAIN

Away they go through Sunny France,
From Metz to gay "Paree;"
The children romp and sing and dance;
"Viva! Monsieur Berri."

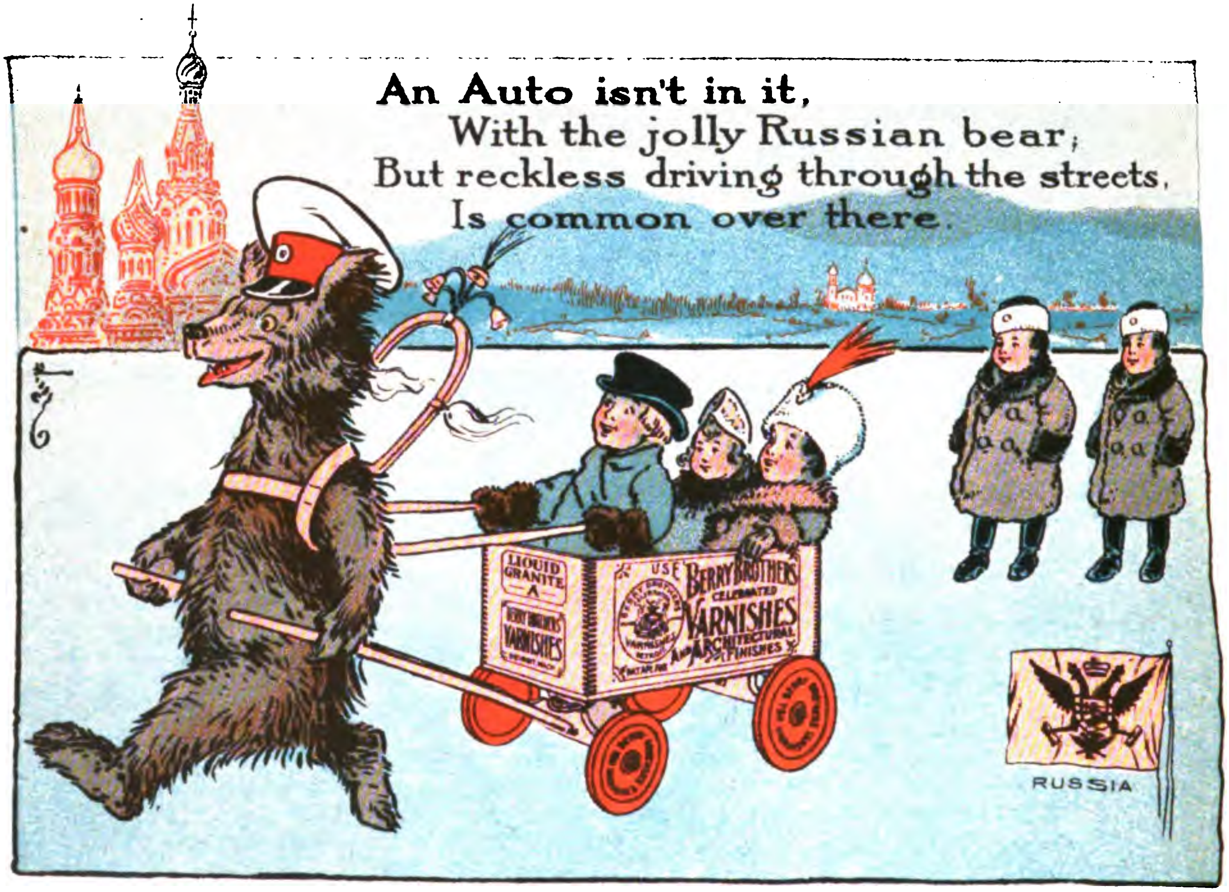


The Berry Wagon climbed the Alps,
In the rosy flush of morn;
It wouldn't be surprising,
If it climbed the Matterhorn.

Gallop away through Germany,
Past Bingen on the Rhine;
The Berry Cart is everywhere,
Their Varnish must be fine.
USE
BERRY BROTHERS
CELEBRATED
VARNISHES
AND ARCHITECTURAL FINISHES
BERRY BROTHERS
VARNISHES
GERMANY



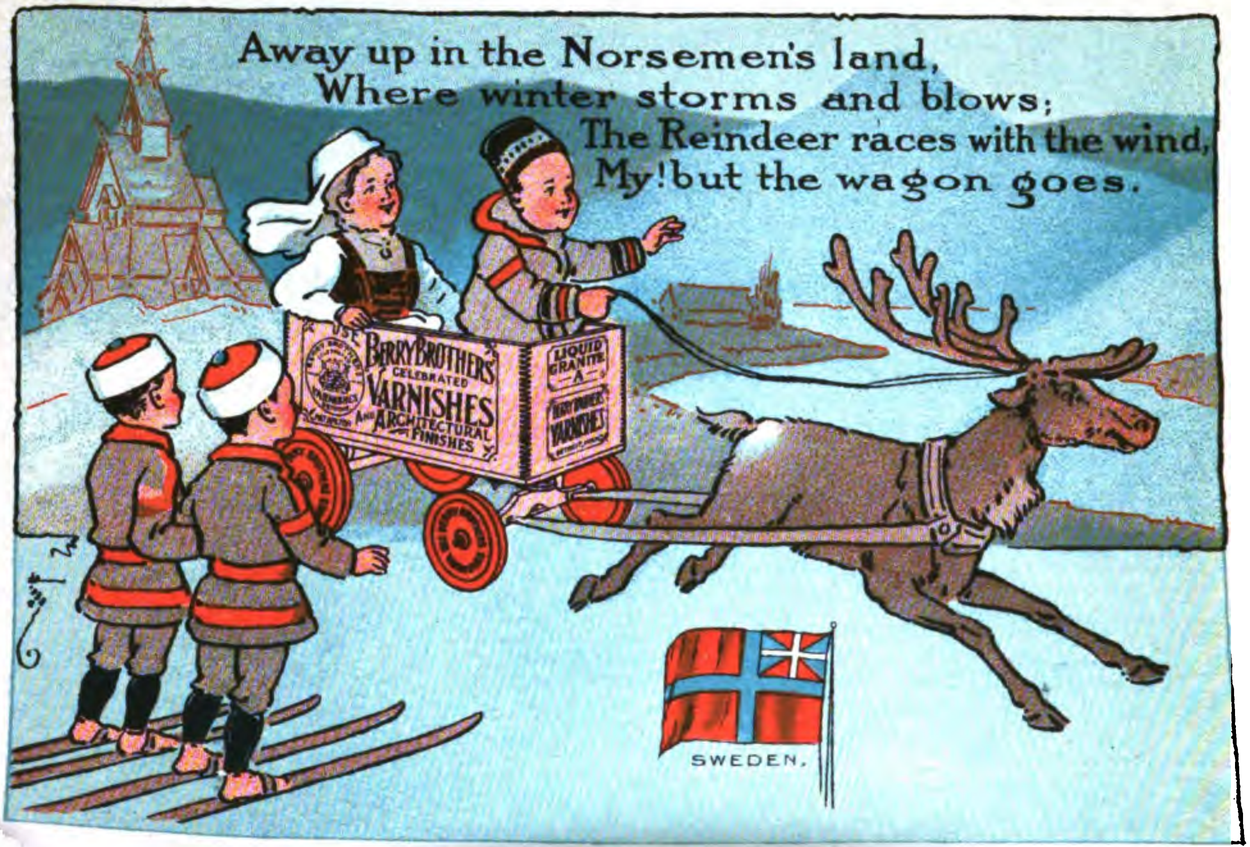
Dutch children all have wooden shoes,
And wear a happy smile;
They ride the Berry Wagon,
In the grandest kind of style.



An Auto isn't in it,
With the jolly Russian bear;
But reckless driving through the streets,
Is common over there.

LIQUID GRANITE A
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
RUSSIA

Even the little Esquimaux,
Far up in the land of ice and snow,
May ride like other children fair,
'Cause there's a Berry Wagon there.
LIQUID GRANITE A
BERRY BROTHERS VARNISHES
USE BERRY BROTHERS CELEBRATED VARNISHES AND ARCHITECTURAL FINISHES
LAPLAND

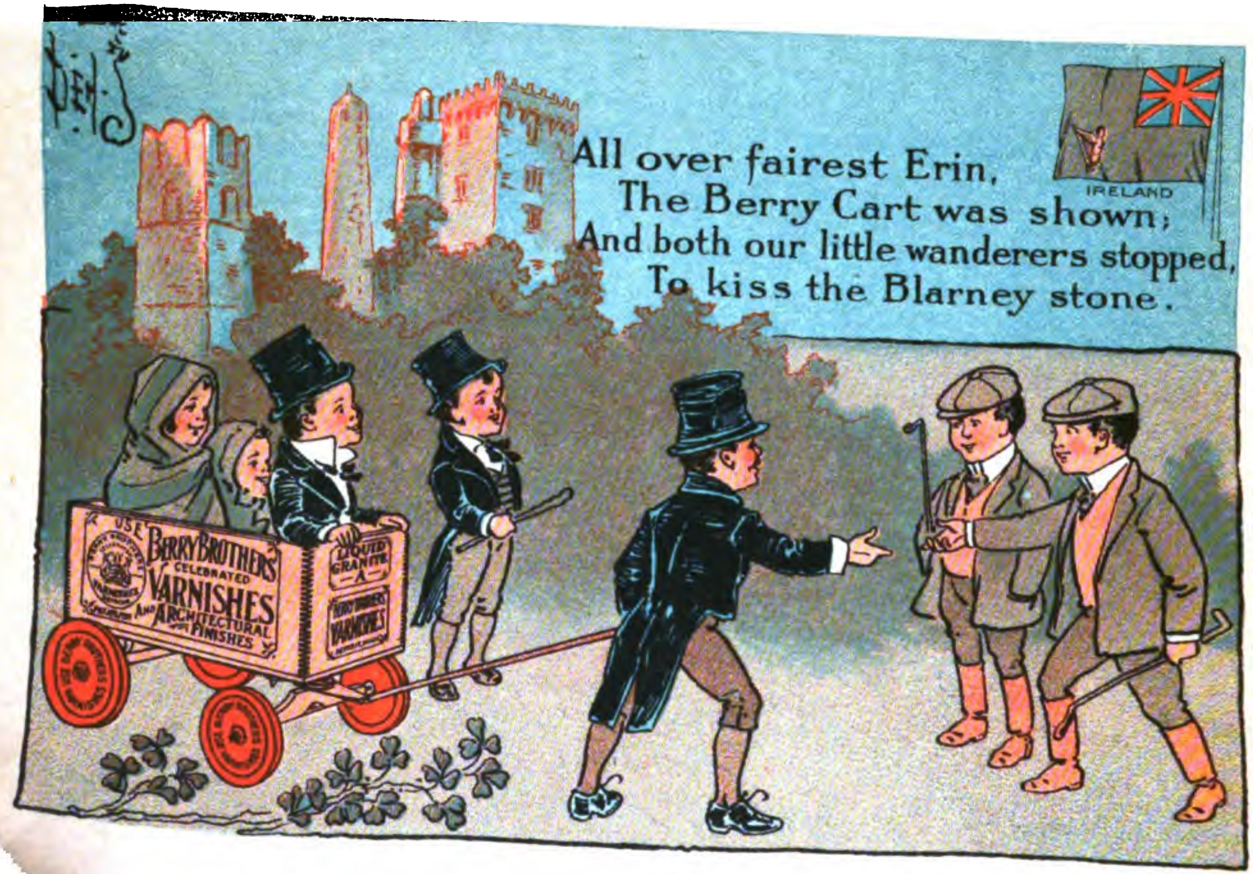

Away up in the Norsemen's land,
Where winter storms and blows;
The Reindeer races with the wind,
My! but the wagon goes.
USE
BERRY BROTHERS'
CELEBRATED
VARNISHES
AND ARCHITECTURAL FINISHES
LIQUID GRANITE
BERRY BROTHERS' VARNISHES
SWEDEN.

SCANDINAVIA, the land of the Norsemen. Skeletons and other remains show that Scandinavia was settled many thousand years ago from Europe and Asia. Scandinavia is believed to be the true home of the Teutonic race. The Scandinavians include Norwegians, Swedes, Danes and Icelanders—all "longhaired blonds." Swedes blend less with other nations than Norwegians and Danes, therefore, they are more like the original Scandinavian people. Denmark, Sweden and Norway all united under Queen Margaret, in the year 1397 A. D., under the Union of Calamar, which lasted until 1523. Christianity was introduced into Denmark in the 6th Century, and in Sweden in the 9th Century. Norway was not known before the 9th Century, but about the year 1000 A. D., the Norsemen, who were warlike, were the terror of all Europe. The history of Sweden, Norway and Denmark is one of many wars, conquests and reforms. But they have always been God-fearing, industrious and honest people, and make the best type of citizen in all the lands they have emigrated to.

By the banks and braes o' Bonny Doon,
The Berry Wagon flew,
The Malcolm cheered.
MacPherson piped,
Douglas too.
SCOTLAND
LIQU
GRAN
VARNISH

SCOTLAND. The growth of the Scottish nation is one of the most wonderful facts in history. The ancient Romans called the northern part of the island of Britain, Caledonia. Scotia was then Ireland, and the first people called Scots were from the Emerald Isle. The Scots came and settled in Caledonia and called the country Nova Scotia, (New Scotland,) like the Nova Scotia in British America. The Romans never quite conquered Scotland, as they did England, and the Picts and Scots were a warlike people making successful raids upon their southern neighbors, who called on the Anglo Saxons to help them drive the Scots back to their homes among the hills of Scotland. In the year 449 a Saxon chief, named Edwin, founded Edinburgh—the town or borough of Edwin.

The Celts or Scots of Ireland were Christians converted by St. Patrick. In 836 Kenneth became King of the Scots. The Saxons from the South, and the Norwegians and Danes from the North and East, combined to form a new nation. When William the Conqueror invaded England he marched up into the Scotch country and conquered Malcolm III, who had killed Macbeth, the early king about whom Shakespeare wrote the great tragedy. Scotland submitted to England during the reign of Henry II, but Richard Lion-heart wanted money for a crusade to the Holy Land, so he sold Scotland's Independence back to her for 10,000 marks. Scotland was invaded by Edward I, in 1296. The Scots were victorious under Wallace in 1297, but defeated the next year. Soon after Wallace died (1305) Robert Bruce, the national leader, was crowned. The independence of Scotland was won by the great victory at Bannockburn, June 24, 1314. Robert Burns, the greatest Scotch poet, wrote the stirring war song, "Scots wha hae wi' Wallace bled," which ends with "Bruce of Bannockburn." Robert II (1371) was the first of the Stuart kings of Scotland. Mary Stuart (Queen of Scots) claimed the right to be queen of England and was beheaded for this by her cousin, Elizabeth, the reigning queen. But Elizabeth left the English throne to Mary's son, James VI, of Scotland, who became James I of England. From this time Scotland has been part of Great Britain, and has had no history separate from that of England.



All over fairest Erin,
The Berry Cart was shown;
And both our little wanderers stopped,
To kiss the Blarney stone.

IRELAND. According to the most ancient traditions, the first inhabitants of Ireland were subdued by the Gaels or Milesians. In the fourth century of the Christian era the people of Ireland were called Scoti or Scots. St. Patrick came in the fifth century, and nearly the whole island was converted to Christianity. There is a popular legend of St. Patrick driving all the reptiles out of Ireland into the sea. The University of Armagh was founded and flourishing long before Alfred the Great founded Oxford, England. Settlements were made on the eastern coast of Ireland in the 9th and 10th centuries by the Northmen. Danish invasions were ended by the victory at Clontarf, gained by the Irish chief, Brian Boru, in 1014. In 1172 Henry II of England, authorized by the Pope Adrian IV, began the conquest of Ireland. This warfare against Erin was kept up for centuries, until, in 1541, Henry VIII received from the Anglo-Irish Parliament at Dublin, the title of "King of Ireland." All efforts to introduce the English Church Reformation to Ireland led to repeated revolts among the loyal Irish, who rose and massacred the Protestants in 1641, and were punished by Cromwell in 1649. Ireland adhered to the cause of James II, and was defeated in the Battle of the Boyne, July 12, 1690.

There was an unsuccessful rebellion in 1798. The Act of Union doing away with the Irish Parliament and uniting Ireland with Great Britain, went into force, Jan. 1, 1801. Emmet's rebellion, in 1803, was unsuccessful. The potato famine of 1846 and 1847 was followed by a great Irish emigration to America. There was a "Young Ireland" rebellion in 1848; and Fenian outbreaks in 1865 and 1867. The Land League was suppressed in 1881, and the National League was organized the following year. Home Rule agitation followed under the leadership of Parnell. Gladstone introduced the Home Rule Bill in 1886, but it failed to pass. It did pass the House in 1893, but was rejected by the House of Lords.

"Now through Merrie England,
From Ramsgate to Islay;
Then home again as the world cries out,
Berry Brothers Hurray
ENGLAND
QUID
NITE
BROTHERS'
NISHES
T, MICH.
VARNISHES

ENGLAND was known as early as the time of the Phœnicians. The Romans called the *island* Britannia. Cæsar landed there 55 B. C., and the Romans ruled till the 5th Century, A. D. Ethelbert of Kent brought the Christian religion to the island. Alfred the Great *began* to rule in 871, and Oxford University was founded. Athelstan and Canute were followed by Edward the Confessor and William the Conqueror, and the battle of Hastings was fought in 1066. Henry II (Plantagenet), in the year 1154, was succeeded by Richard *Lion-Heart*, who went, in the Third Crusade, to the Holy Land. John reigned in his place, and after Richard died, John issued the Magna Charta, in 1215. In the reign of Edward I, “*Wallace bled*” in Scotland; and in 1295 the first perfect Parliament was held. Edward II was defeated by Robert Bruce at Bannockburn, 1314. Joan of Arc of France and Jack Cade *opposed* Henry VI, and the “Wars of the Roses,” so called because the Lancaster side wore red roses and the followers of the Duke of York, white roses. Henry VIII is remembered for his six wives and the English Reformation. Elizabeth’s reign, from 1558 to 1603, was the most brilliant in English History. Shakespeare wrote his dramas and poems, the Spanish Armada was destroyed, and Mary Stuart was beheaded. Elizabeth left the throne to *James I*, who worried the Puritans so that they fled to Holland and America. Charles I succeeded in 1625, quarrelled with Parliament, and was beheaded in 1649. Then *came* Cromwell with Milton and the Puritans. Charles II was restored to the throne in 1660. William of Orange and Mary, his wife, drove James from the kingdom. Under “Good Queen Anne” Marlborough won his “famous victory,” and England, joined with Scotland, became Great Britain, in 1707. Of the four Georges, George II was king of England at the time of the Revolution of the American Colonies. Victoria ascended the throne *in 1837*, and her reign, to 1901, was the longest and most brilliant in English History. The Crimean War and the Civil War in the United States were among the greatest events of *Victoria*’s reign. Literature, the arts, sciences and inventions made great strides. Edward VII succeeded to the throne in 1901, died in 1910, succeeded by King George V, 1911.

BERRY BROTHERS, Incorporated

ESTABLISHED 1858

LARGEST VARNISH MANUFACTURERS IN THE WORLD

FACTORIES

DETROIT, MICH. WALKERVILLE, ONT.

Branches:

NEW YORK,
262 Pearl Street

BOSTON,
176 Federal Street

BALTIMORE,
29 South Hanover Street

PHILADELPHIA,
26-28 North 4th Street

CHICAGO,
303 North Michigan Avenue

CINCINNATI,
323 5th Avenue E

ST. LOUIS,
112 North 4th Street

SAN FRANCISCO,
250-256 1st Street

9c 170 ✓

9

PYROLIN

TRADE MARK

Fire Resisting
Linseed Oil
PAINTS
and Products

Manufactured by
PYROLIN PRODUCTS CO., INC.
Fort Dodge, Iowa
U.S.A.

BER
LARGEST
DET
NEW YORK.
262 Pearl Str
PHILA
CINCINNATI,
323 5th Aven

No cause for worry—our home is painted with Pyrolin

PYROLIN
STOPS FIRE

and there's no Better* PAINT *Made

All fear of fire may now be removed with the annual death toll in the United States of 600 lives and a property loss of $350,000,000 from fire—for

Where Pyrolin is used *fire ceases to be*, and as a paint there is no better paint made than Pyrolin.

The U. S. Government experts have given Pyrolin a most severe test and found the above statement true—see their report on page 6, of this book.

Expert analytical chemists have tested and analyzed Pyrolin and found it to be absolutely fire retardant and one of the best linseed oil paints made—see their reports in this book.

The tests Pyrolin has been put to in actual use by fire and the elements during the six years it has been made and sold also demonstrate it to be absolutely fire retardant and to be a good and durable paint. These facts are also contained in this book.

Because you are interested in protecting your family, your property and yourself from possible death and loss by fire, you will read this booklet from cover to cover, and will further supplement the evidence contained therein by personally investigating Pyrolin.

The picture on the opposite page is evidence that Pyrolin stops fire. There is an interesting story connected with this corncrib.

In the fall of 1911, Mr. F. M. Wolf, a farmer whose address is Wesley, Iowa, built a new corncrib. Mr. Wolf did not pay much attention to what the dealer in Wesley said about the fire resisting qualities of the Pyrolin Paint he sold him with which to paint his new corncrib.

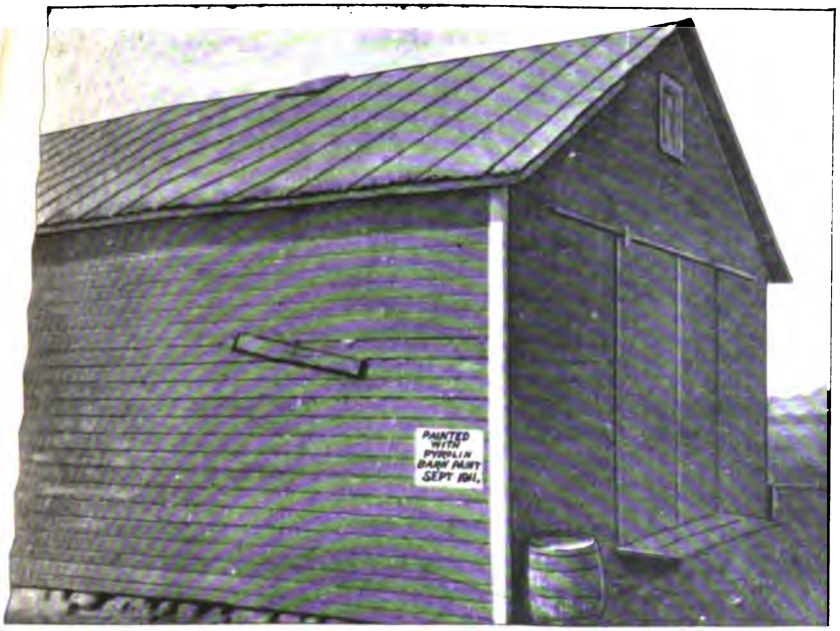
He found the paint to be good—it flowed easily and covered well — but he forgot all that was said about its fire resisting qualities, and would probably never have given it another thought had not something happened to bring this fact very forcibly to his mind.

About three years after he built and painted his new corncrib, on his return home from town, he found there had been a fire, and all of his buildings had been burned to the ground, except the corncrib, although it stood only four feet from the main barn, and where the fire was the hottest.

The picture on the opposite page was taken after the fire. You will notice the edge of the roof is charred just a little, and represents all of the damage done to the corncrib by the fire.

You may be sure Pyrolin is the only paint now sold in that locality, and for miles around.

The following brief letter contains Mr. Wolf's own story of the fire:



Corncrib of Mr. F. M. Wolf, of Wesley, Iowa, which was saved from fire by Pyrolin Paint

Pyrolin Products Co., Inc., Wesley, Iowa.
Fort Dodge, Iowa.

Gentlemen:

On October 16th my barn and all other outbuildings and sheds burned to the ground, with the exception of a corncrib, which was painted with your PYROLIN Fire Resisting Paint three years ago, and which did not burn, although the barn, only four feet from it burned.

I cannot say too much for your paint.

Yours very truly,

(Signed) F. M. Wolf.

9

Report of Inflammability Test of Wood Painted with Pyrolin Factory Interior White

**Made by the United States Department of Agriculture
Forest Service, at the Forest Products Laboratory,
Madison, Wisconsin.**

The principal object of the investigation described in this report was to determine, if possible, what are the most practical methods of rendering wood fire resistant.

The testing apparatus shown on page eleven was designed, and the tests conducted at the Forest Products Laboratory, Madison, Wisconsin, maintained by the Forest Service of the United States Department of Agriculture, in co-operation with the University of Wisconsin.

The test was most severe. The apparatus used consisted of a chamber made of asbestos board, 22 inches long, 10 inches wide and 7 inches thick.

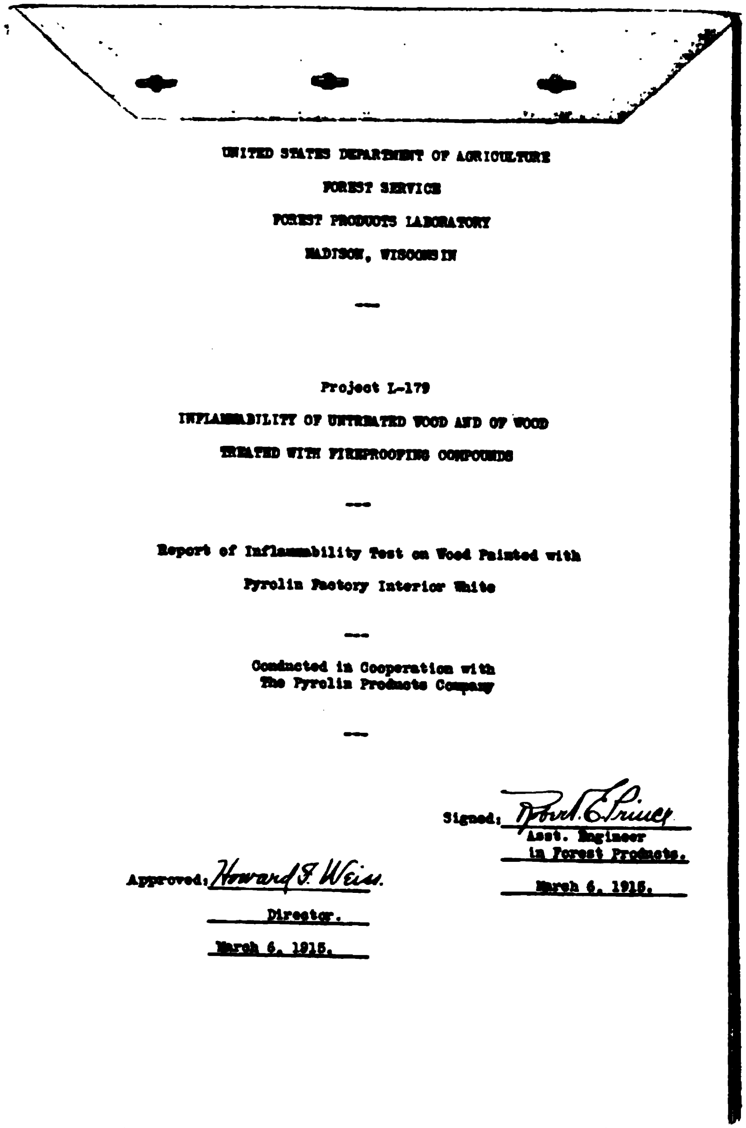
The heat was obtained from two electric heating coils, fastened together and placed in the apparatus in such a manner that the heat radiated to the lower part of the test specimen, which was placed three-fourths of an inch distant.

A gas pilot light was allowed to burn just below the center of the heating plates.

Three cypress boards were painted with one coat of Pyrolin Factory Interior White, and three with two coats of white lead paint. In the case of the white lead, the first coat was allowed to dry for three days before the second coat was applied.

The specimens painted with white lead were allowed to season in the laboratory for approximately 45 days before testing.

(Continued on page 8)



UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
FOREST PRODUCTS LABORATORY
MADISON, WISCONSIN

Project L-179
INFLAMMABILITY OF UNTREATED WOOD AND OF WOOD
TREATED WITH FIREPROOFING COMPOUNDS

Report of Inflammability Test on Wood Painted with
Pyrolin Factory Interior White

Conducted in Cooperation with
The Pyrolin Products Company

Signed: Robert E. Prince
Asst. Engineer
in Forest Products.
March 6, 1915.

Approved: Howard F. Weiss.
Director.
March 6, 1915.

Facsimile of Government Report

BER

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DET

NEW YORK.
262 Pearl Str

PHILA

CINCINNATI,
323 5th Aven

The specimens painted with Pyrolin Factory Interior White were tested 24 hours after the painting.

Sufficient electric current was passed through the heating coil to give the plates a temperature of approximately 325 degrees centigrade.

The radiated heat caused a distillation of the wood or the giving off of volatile inflammable gases. To ignite these gases the pilot light was flashed up past the face of the specimen at five second intervals.

The length of time necessary to ignite the specimens was determined by means of a stop watch.

Their official table, which may be found on page 10, shows that Pyrolin Factory Interior White proved very effective in retarding the ignition specimens used in the test.

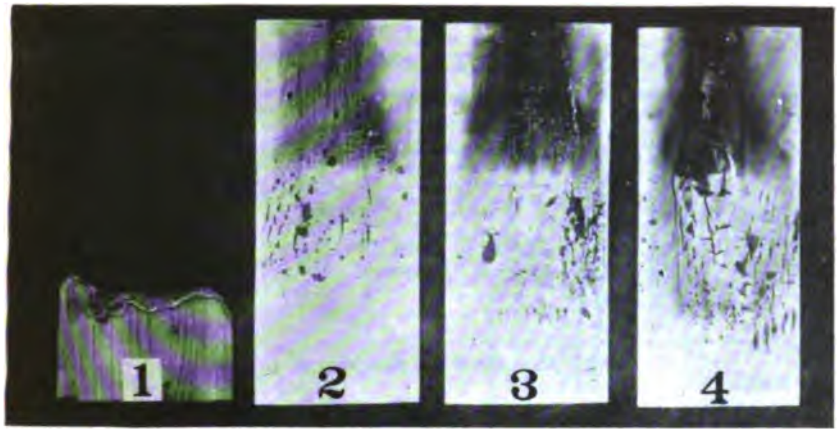
The first specimen was allowed to remain in the apparatus exposed to the heating plate for thirty minutes. No ignition occurred during that time, and the specimen was not charred through.

The second specimen was exposed to the heating plate 40 minutes without igniting, and upon examination was found to be charred through.

The third specimen ignited after eight minutes exposure and burned poorly for eleven minutes, when it went out, and could not be ignited again.

The average time of exposure to the heating plate before ignition was as follows:

Pyrolin Factory Interior White	26 minutes.
White Lead Oil Paint,	2 minutes, 40 seconds.
Unpainted Cypress,	1 minute, 8 seconds.



Photograph of specimens after tests were made

Two of the three specimens painted with the Pyrolin Factory Interior White did not ignite, but charred after a duration of 30 and 40 minutes, respectively.

The above illustration shows the condition of the boards after being taken from the inflammability apparatus.

No. 1. Natural specimen of cypress (not treated with Pyrolin). Upper portion consumed in 9 minutes.

No. 2. Cypress board painted with Pyrolin Factory Interior White. 30 minutes, no ignition.

No. 3. Cypress board painted with Pyrolin Factory Interior White. 40 minutes, no ignition.

No. 4. Cypress board painted with Pyrolin Factory Interior White. Ignited in 20 minutes, but poor combustion.

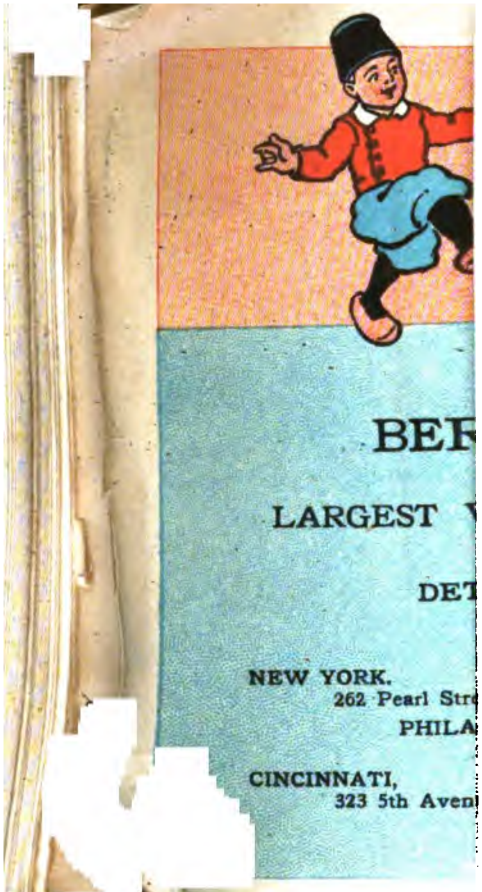
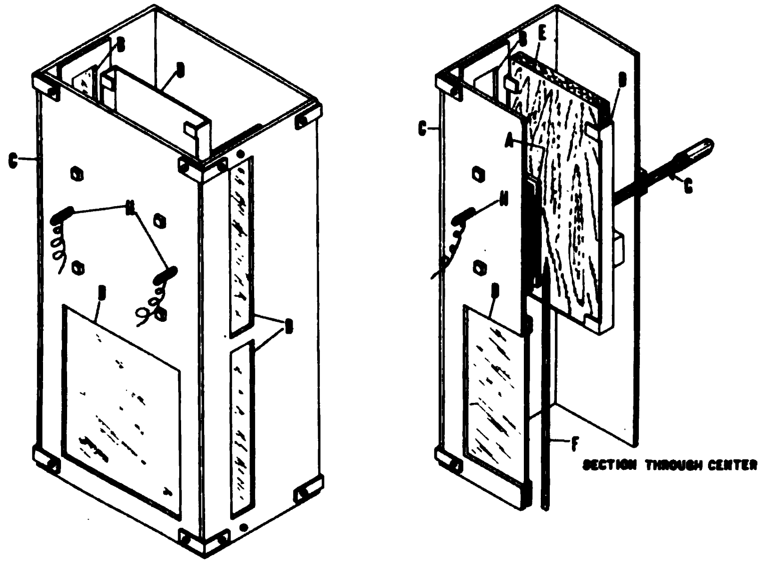


Table showing result of test at the U. S. Forest Products Laboratory

Treatment	Number of Specimens in average	Average Temperature of plate when Specimen was placed.	Average time of Exposure in Heating Plate		Duration of Burning After Removal.	Remarks
			Before Ignition	After Ignition		
		Deg. Cent.	Min. Sec.	Min. Sec.	Min. Sec.	
Natural Untreated Cypress	3	325	1 : 8	Entire Time	9 : 5	Burned violently. All but lower portion consumed.
White Lead Oil Painting	3	325	2 : 40	"	9 : 50	Burned poorly at start, but gradually grew stronger. All but lower portion consumed.
Nepolite	3	325	3 : 38	"	10 : 25	Difficult to ignite, but after ignition burned violently. All but lower portion consumed.
Permanite	3	325	3 : 47	"	9 : 20	Same as Nepolite.
Pyrolin Factory Interior White	**3**	**325**	**26 : 00**	"	**See Remarks**	**Two of the specimens did not ignite after a duration of 30 and 40 minutes respectively. The third specimen ignited after 8 minutes, burned poorly for 11 minutes and then went out and could not be ignited again. The burning in this case was confined to the area opposite the heating plate.**



INFLAMMABILITY APPARATUS

Above is a picture of Inflammability Apparatus used in making the Government test. The result as shown in the table and picture of the wood on page 9, after the fiery ordeal was complete, is proof conclusive that Pyrolin is the greatest fire retardant known, *that it does stop fire.*

¶ Pyrolin is the only paint that really protects, and there is abundance of evidence that as a paint there is no better paint made.

Following are facsimiles of the signatures of the government experts who made the test as they appeared on the official report.

Approved: Howard F. Weiss.
Director.
March 6, 1915.

Signed: Robt. E. Prince
Asst. Engineer
in Forest Products.
March 6, 1915.

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Plumber's Blow Torch Test

On the following page is shown further proof of the fire resisting qualities of Pyrolin. This is a simple test that may be made by anyone.

The illustration represents an ordinary piece of cypress wood painted with one coat of Pyrolin Factory Interior White.

A plumber's blow torch, generating 2100 degrees of heat was applied at point "A" for one hour. At the expiration of that period a hole was charred through the wood as shown.

At point "B" the same torch was applied for fifteen minutes, only charring the outside surface.

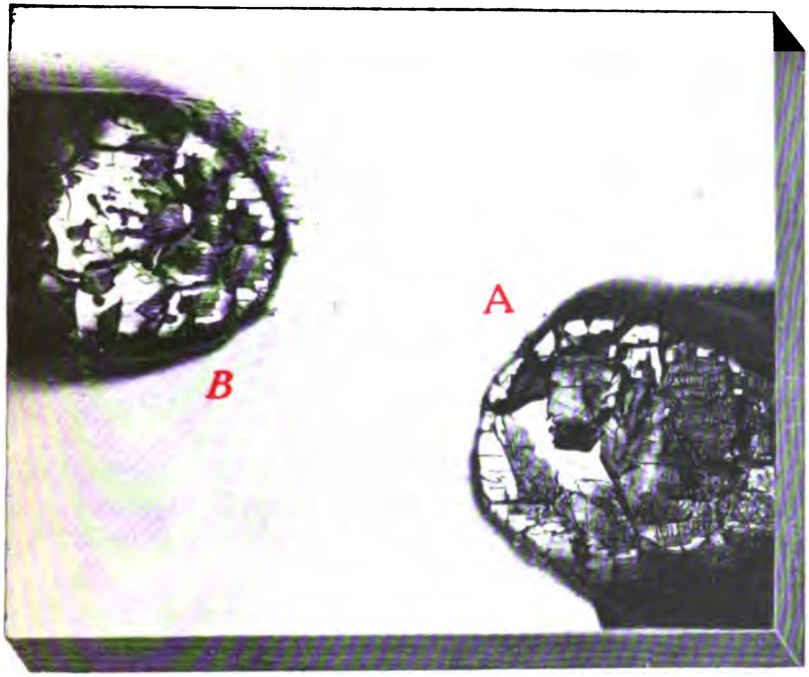
The board did not catch fire and burn in either case.

Can you think of a more severe test?

This should be all-convincing. And, remember, there is no better paint, as a paint, on the market, and it does not cost any more than any other first-class paint.

Don't you think you owe it to yourself and family to beautify, protect and insure your buildings from fire at the same time, and at the same cost charged for ordinary good paint?

The evidence contained in this booklet of the protection that Pyrolin Paint will afford from fire is so conclusive and convincing that everyone who reads it should at once decide to use Pyrolin as a matter of personal safety for themselves, their family and property.



Illustrating Plumber's Blow Torch Test

An insurance policy does not protect life and property from fire. It guarantees to pay so much money to cover the value of the property destroyed—that's all. A home, factory or other buildings painted with Pyrolin insures the safety of lives as well as property—for then fire ceases to be.

The Plumber's Blow Torch Test shown on this page is more severe than any test that could possibly occur from a fire that might result from misfortune or carelessness.

We are able to state with absolute assurance that any surface thoroughly coated with Pyrolin Products, in accordance with our instructions, is rendered a positive and permanent resistant to the spread of flames; and the longer applied the better the fire resisting qualities.

The Shingle Test

The Shingle Test illustrated on the next page was made on the top of a ten story building in Chicago where the wind was blowing and fanning the flame.

The first group shows two cedar shingles painted with Pyrolin Red Shingle Stain placed by the side of two unpainted shingles.

The second group shows them three minutes after the untreated shingles were set on fire. Note how the flame is enveloping the two shingles painted with Pyrolin.

The third group was taken four and a half minutes after the fire was started. In this short space of time the two untreated shingles were almost consumed.

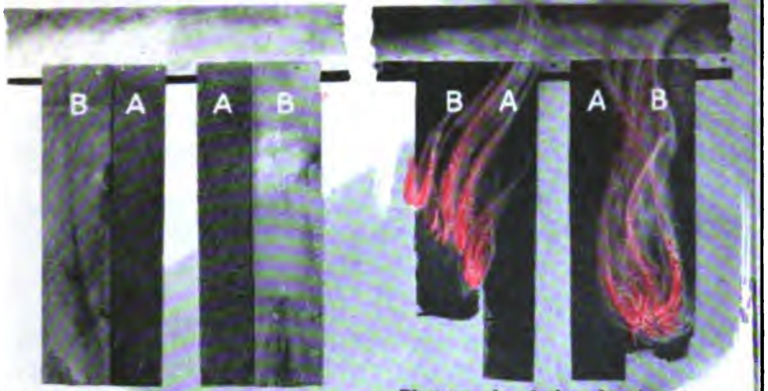
Group four is a photograph of the shingles after the fire went out. The Pyrolin painted shingles are a little charred on the edges, but they did not catch fire.

> Now that wood shingles may be made absolutely fire resisting they will soon become the preferred roofing material.

On October 7, 1915, a terrific hurricane swept over New Orleans, La.

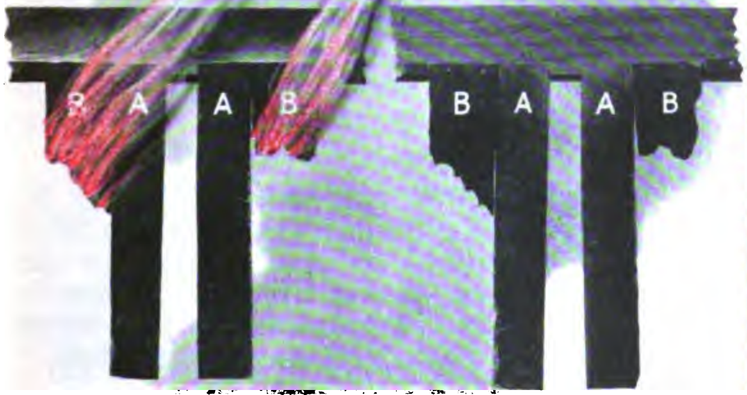
Following is an extract from a New Orleans paper of that date:

"The building code of New Orleans prohibits the use of wooden shingles on buildings which are now being constructed, but there are a large number of residences which were constructed before this feature of the building code went into effect. Investigation has shown that these buildings which were roofed with Cypress Shingles suffered little injury from the storm."



Group of Cedar Shingles. The two inside ones (AA) were dipped in Pyrolin Red Shingle Stain. The outside ones (BB) were plain, untreated shingles

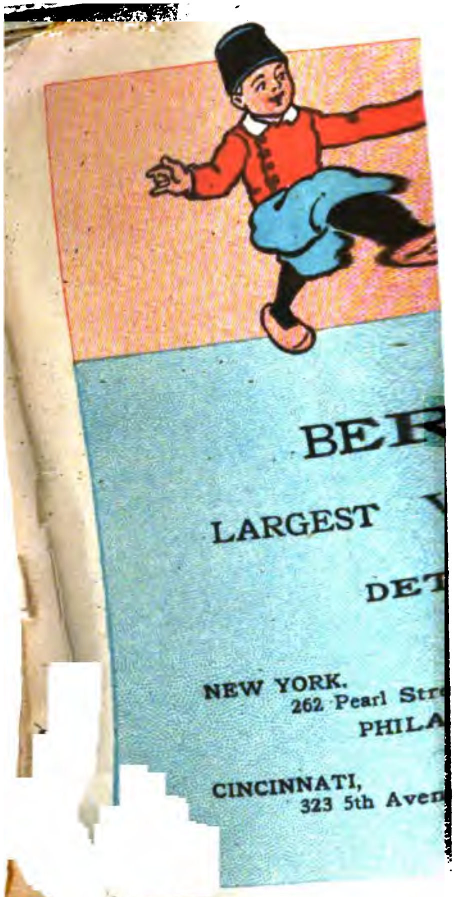
Photograph of the shingles three minutes after fire was started



Photograph of the shingles four and one-half minutes after fire was started

Photograph of shingles after the fire on the untreated shingles was put out, showing that shingles dipped in Pyrolin did not ignite and were only slightly charred on the edges

A shingle test that proves the fire-retardant qualities of Pyrolin



BER
LARGEST
DE
NEW YORK,
262 Pearl Str
PHILA
CINCINNATI,
323 5th Aven

It is a well known fact that wooden shingles will last longer, and withstand storms without injury that destroy the many so-called fire proof substitutes.

Because of the inflammability of the wood shingle roof its construction has been prohibited in many cities and towns.

Now that Pyrolin Shingle Stain makes wood as fire resisting as slate or tile, their use will again become general.

In addition to its absolute protection from fire, shingles treated with Pyrolin Shingle Stain will last more than five times as long as when painted with any other shingle stain (or unpainted), as Pyrolin not only protects from fire but from the elements as well.

On the following page is further proof that shingles treated with Pyrolin Shingle Stain will not burn.

In May, 1913, while the Armstrong Apartments at 2nd Avenue and 6th Streets, Fort Dodge, Iowa, were being remodeled, one of the White Transfer Company's warehouses was burned. All houses and buildings in the vicinity caught fire from burning cinders.

The roof of the Armstrong Building had just been finished with shingles treated with Pyrolin Shingle Stain. Burning cinders fell on the roof, but there was not the slightest sign of the roof catching fire. The fire chief said afterwards that he saw burning pieces as big as a man's head drop on the roof.

On the next page read what Mr. F. B. Trusty, Fire Chief of Fort Dodge, Iowa, has to say about Pyrolin Shingle Stain, and what it would mean in the saving of lives and property if generally employed.

Armstrong Apartments, saved from fire by Pyrolin Shingle Stain

Fire Department Headquarters,
Fort Dodge, Iowa.
May 6, 1915.

Hon. J. F. Ford, Mayor,
Fort Dodge, Iowa.

Dear Sir:

The largest per cent of fires traceable to any one cause is that of sparks setting fire to shingles. This is true of other cities as well as Fort Dodge. I also wish to say that we have never had an alarm for a fire on a roof that has been painted with Pyrolin Paint or Shingle Stain, and do not anticipate one.

If the shingle roofs in Fort Dodge were treated with Pyrolin there would be a large saving in property loss and in calls for the department.

This letter is written with the suggestion that it be published in the interests of the saving of property and of the possible loss of life.

Respectfully submitted,
(Signed) F. B. Trusty,
City Fire Department.

Further Proof of the Fire Resisting Qualities of Pyrolin

The illustrations on the following page tell a convincing story of the fire resisting qualities of Pyrolin.

Three buildings six feet high and four feet square were built of ship-lap, or pitch pine—the most inflammable wood known.

One of the buildings was painted with best grade white lead and linseed oil paint. The other with a ready-mixed paint of a standard brand purchased on the market. The third was painted with Pyrolin Paint.

The buildings were placed five feet apart, with signs showing with what paint each had been painted.

Between the buildings, and on either side and back, a large quantity of excelsior, lath and shingles, with other combustible materials, were placed. Over this was poured a gallon of gasoline.

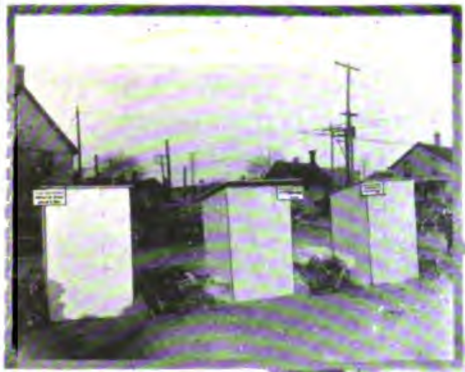
The first view shows the buildings before the fire was started.

The second picture four minutes after fire was started, while picture number three was taken twenty-two minutes after.

In thirty minutes the two outside buildings were entirely consumed, while the building painted with Pyrolin was intact as shown by the illustration.

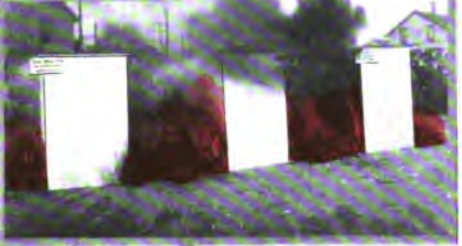
> This demonstration shows that a building painted with Pyrolin is absolutely safe, even though it be surrounded by burning buildings.

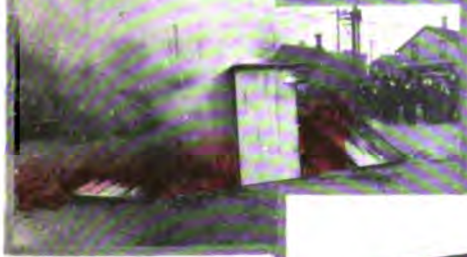
With such convincing proof the demand for Pyrolin Paint will soon be universal.



Before Starting the Fire

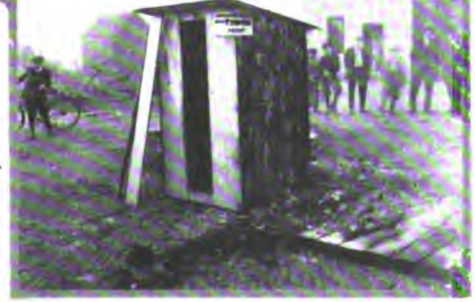
Four Minutes After Starting Fire





Twenty-two Minutes After Starting Fire

Thirty Minutes After Starting Fire



BE
LARGEST
DE
NEW YORK.
262 Pearl Str
PHILA
CINCINNATI,
323 5th Aven

When a paint will protect from fire, preserve the wood, go farther and last longer than the average first-class paint, there is every reason why such a paint should be used exclusively; and that paint is PYROLIN. It may be bought at the same price as any of the standard paints on the market.

The small town and country homes, the barns and outbuildings of the farmer are especially at the mercy of fire on account of the absence of adequate fire protection.

> If buildings so situated were painted with Pyrolin there would be no cause for anxiety regarding fire.

The experience of Mr. E. L. Cavanaugh of Clare, Iowa, is convincing evidence of this fact.

His story is best told in his own letter which follows:

Clare, Iowa,
October 28, 1912.

Pyrolin Products Co. Inc.,
Fort Dodge, Iowa.
Gentlemen:

In 1906 we had our implement building at this place painted with the Pyrolin Fire-Proof Paint, which gave satisfactory results so far as appearance, covering capacity and durability are concerned.

We had no test of its fire resisting qualities until December 11th, 1911, when almost all the entire business portion of the town of Clare was destroyed by a severe conflagration.

Our implement building was just eight feet from the nearest building in the direct path of the flames, which beat

Implement Building at Clare, Iowa, saved by Pyrolin

against the side of our building. The fire was so hot that it did not seem possible it could be saved.

The woodwork charred and blackened, but the flames did not carry; the building was saved *and the fire was stopped.* We are using the building every day.

Even the boards on the inside of the building were blackened in many places, owing to the intense heat on the outside.

We believe your fire-proof paint is a remarkable product. The fire adjustors in going over the ground afterwards could not understand why or how our building was saved, but we are thoroughly convinced that the paint used was the means of saving the property.

Yours very truly,
(Signed) E. L. CAVANAUGH.

Expert Testimony

The very best and most satisfactory evidence in favor of a product is that it makes good in practical use. We have furnished this proof.

Approval, based on expert analysis, is also of great value, for then we know the reasons why the products make good.

Mr. H. M. Deavitt, expert analytical chemist, of Chicago, made a test of our Pyrolin Linseed Oil Paint in comparison with three other of the leading and well known brands of paint on the market.

In his report he states:

"Pyrolin covers more square feet per gallon, and when exposed to the action of gases and acids, as found in the atmosphere, it shows greater durability and gives a better finish."

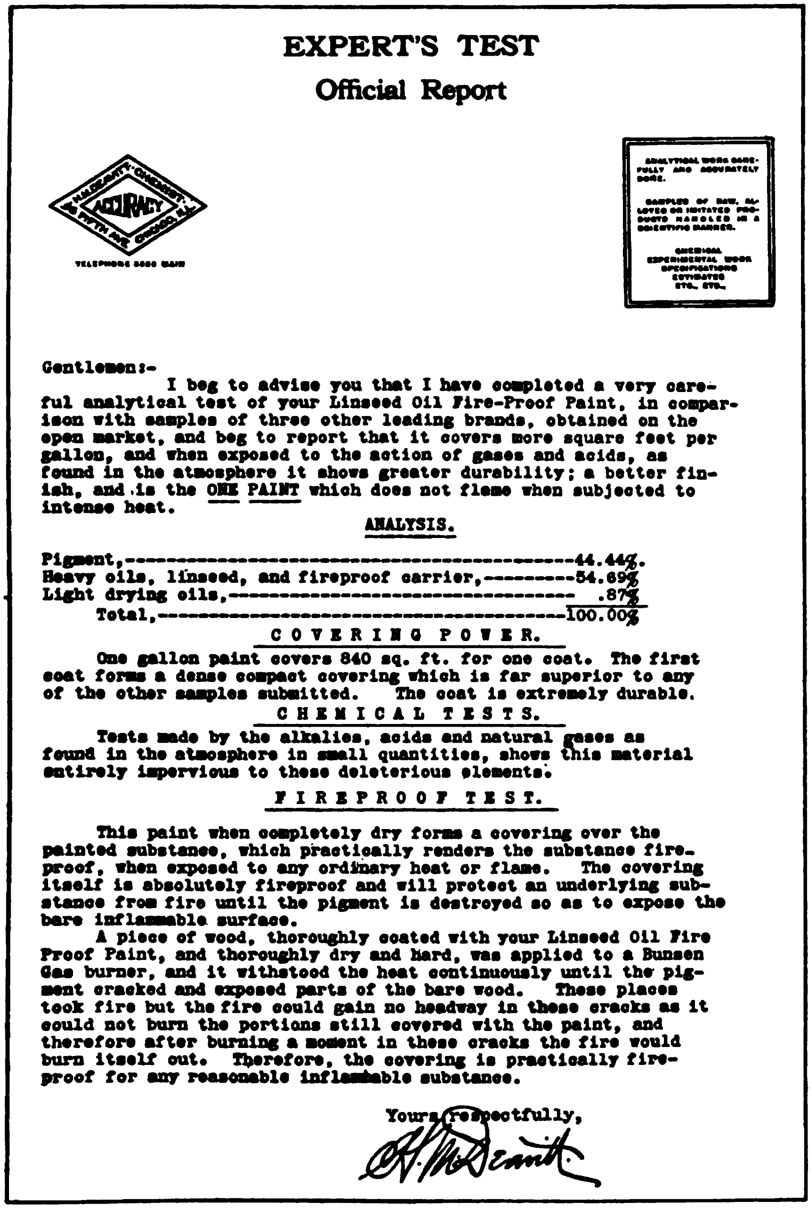
This backs up our claim for Pyrolin, that there is no better paint made. In fact, Mr. Deavitt's test demonstrated that Pyrolin was a superior paint to the other three brands.

As a fire retardant, this expert says:

"Pyrolin, when completely dry, forms a covering which practically renders the substance fire proof when exposed to any ordinary heat or flame."

On the opposite page you will find a facsimile of Mr. Deavitt's official report.

It would hardly seem possible that anyone would buy or use any other paint than Pyrolin with such overwhelming evidence that it not only prevents wood and other inflammable substances from carrying fire, but as a paint there is no better paint made.



EXPERT'S TEST

Official Report

H. McDEVITT · CHEMIST · 36 FIFTH AVE. CHICAGO, ILL.
ACCURACY
TELEPHONE 5886 MAIN

ANALYTICAL WORK CAREFULLY AND ACCURATELY DONE.

SAMPLES OF RAW, ALLOYED OR IMITATED PRODUCTS HANDLED IN A SCIENTIFIC MANNER.

CHEMICAL
EXPERIMENTAL WORK
SPECIFICATIONS
ESTIMATES
ETC., ETC.

Gentlemen:-

I beg to advise you that I have completed a very careful analytical test of your Linseed Oil Fire-Proof Paint, in comparison with samples of three other leading brands, obtained on the open market, and beg to report that it covers more square feet per gallon, and when exposed to the action of gases and acids, as found in the atmosphere it shows greater durability; a better finish, and is the ONE PAINT which does not flame when subjected to intense heat.

ANALYSIS.

Pigment,---44.44%.
Heavy oils, linseed, and fireproof carrier,---------54.69%
Light drying oils,---------------------------------- .87%
Total,--100.00%

COVERING POWER.

One gallon paint covers 840 sq. ft. for one coat. The first coat forms a dense compact covering which is far superior to any of the other samples submitted. The coat is extremely durable.

CHEMICAL TESTS.

Tests made by the alkalies, acids and natural gases as found in the atmosphere in small quantities, shows this material entirely impervious to these deleterious elements.

FIREPROOF TEST.

This paint when completely dry forms a covering over the painted substance, which practically renders the substance fireproof, when exposed to any ordinary heat or flame. The covering itself is absolutely fireproof and will protect an underlying substance from fire until the pigment is destroyed so as to expose the bare inflammable surface.

A piece of wood, thoroughly coated with your Linseed Oil Fire Proof Paint, and thoroughly dry and hard, was applied to a Bunsen Gas burner, and it withstood the heat continuously until the pigment cracked and exposed parts of the bare wood. These places took fire but the fire could gain no headway in these cracks as it could not burn the portions still covered with the paint, and therefore after burning a moment in these cracks the fire would burn itself out. Therefore, the covering is practically fireproof for any reasonable inflammable substance.

Yours respectfully,

H. McDevitt

Further Evidence

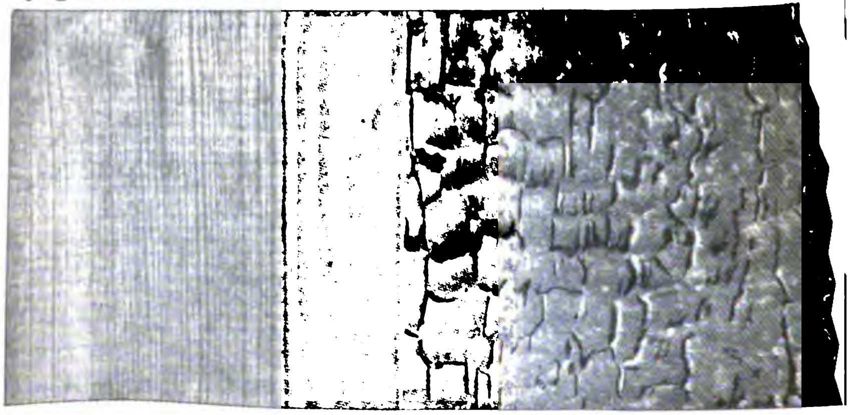
On the opposite page will be found an official report of a test of Pyrolin, made by the Illinois Central R. R. Company.

At present writing twenty-three of the leading railroads of the United States are using Pyrolin. In this connection, remember that it is a well known fact that railroads are slow to praise and slower still to adopt innovations until they have been given every possible test to determine their merit.

Read their report and note the exhibits referred to therein and herewith illustrated.

Board No. 1 referred to in Illinois Central Test

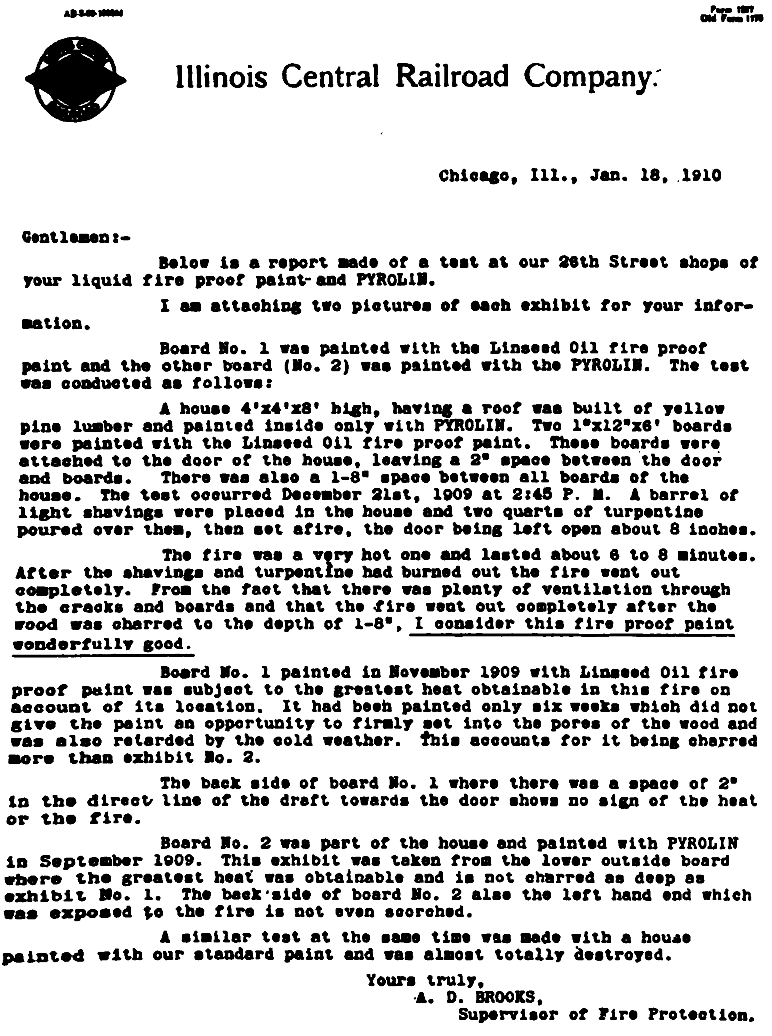
This cut shows both sides of a board taken from the building after the fire was out. Pyrolin Fire Resisting Liquid was applied only on the interior as stated in the official report, page 25.



(See Board No. 2, page 26)

OFFICIAL REPORT

of Test Made by the Illinois Central Railway Co. Chicago, Ill.



Illinois Central Railroad Company.

Chicago, Ill., Jan. 18, 1910

Gentlemen:-

Below is a report made of a test at our 26th Street shops of your liquid fire proof paint and PYROLIN.

I am attaching two pictures of each exhibit for your information.

Board No. 1 was painted with the Linseed Oil fire proof paint and the other board (No. 2) was painted with the PYROLIN. The test was conducted as follows:

A house 4'x4'x8' high, having a roof was built of yellow pine lumber and painted inside only with PYROLIN. Two 1"x12"x6' boards were painted with the Linseed Oil fire proof paint. These boards were attached to the door of the house, leaving a 2" space between the door and boards. There was also a 1-8" space between all boards of the house. The test occurred December 21st, 1909 at 2:45 P. M. A barrel of light shavings were placed in the house and two quarts of turpentine poured over them, then set afire, the door being left open about 8 inches.

The fire was a very hot one and lasted about 6 to 8 minutes. After the shavings and turpentine had burned out the fire went out completely. From the fact that there was plenty of ventilation through the cracks and boards and that the fire went out completely after the wood was charred to the depth of 1-8", I consider this fire proof paint wonderfully good.

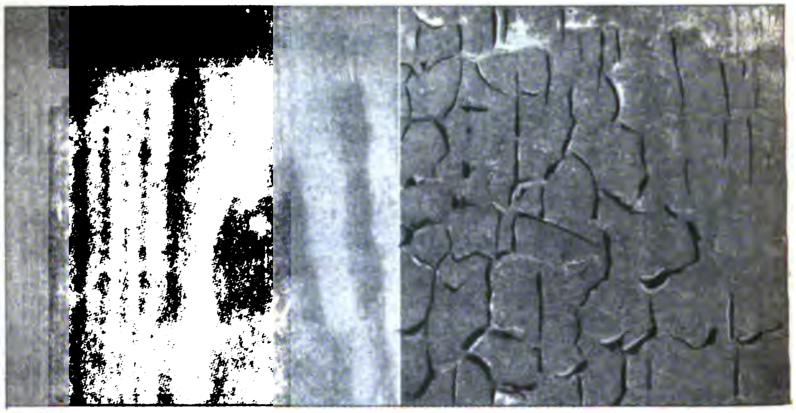
Board No. 1 painted in November 1909 with Linseed Oil fire proof paint was subject to the greatest heat obtainable in this fire on account of its location. It had been painted only six weeks which did not give the paint an opportunity to firmly set into the pores of the wood and was also retarded by the cold weather. This accounts for it being charred more than exhibit No. 2.

The back side of board No. 1 where there was a space of 2" in the direct line of the draft towards the door shows no sign of the heat or the fire.

Board No. 2 was part of the house and painted with PYROLIN in September 1909. This exhibit was taken from the lower outside board where the greatest heat was obtainable and is not charred as deep as exhibit No. 1. The back side of board No. 2 alse the left hand end which was exposed to the fire is not even scorched.

A similar test at the same time was made with a house painted with our standard paint and was almost totally destroyed.

Yours truly,
A. D. BROOKS,
Supervisor of Fire Protection.



Board No. 2 referred to in Illinois Central Test

This cut exhibits both sides of a piece of one of the painted boards after the fire was out. Pyrolin No. 1 Oxide Paint only was applied. Note that the smooth side of the board is not even blistered, although the fire tested it severely. See official report, page 25.

American Society for Fire Prevention:
Inc. under laws of New York

Pyrolin Products Co., Inc., March 8th, 1915.
Fort Dodge, Iowa.
Gentlemen:

We beg to advise you that we have tested paper, cloth and wood treated with your Pyrolin Liquid, and also pieces of pitch pine painted with your Pyrolin House Paint and find both liquid and paint to be as represented.

Accordingly, the American Society for Fire Prevention approves of them as fire retardant products.

Yours very truly,
Committee on Approvals, of
The American Society for Fire Prevention,
(Signed) JAS. P. WHISKEMAN, Chairman.

You have read the proof that Pyrolin stops fire, and there is no better Paint made—

Only facts have been presented, backed by evidence that is all convincing and conclusive.

If you have a home, or contemplate erecting one, in which the lives of your family and yourself may be placed in jeopardy from fire, *what are you going to do about it?*

If you have a factory, hotel or public building, or are about to erect one, in which the lives of your employes, guests or tenants may be imperiled by fire; *what are you going to do about it?*

If you are an architect, contractor or paint dealer, *what are you going to do about it?*

Because it is the duty of every one (and you are going to do YOUR duty) to protect, so far as in their power lies, lives and property, you will use and specify PYROLIN, for the reason you have been furnished with abundance of evidence that it does stop fire, and there is no better paint made.

(See list of Pyrolin Paints and Products on next page.)

List of PYROLIN

FIRE RESISTING

LINSEED OIL **PAINTS** AND PRODUCTS

PYROLIN
Fire Proofing Liquid

PYROLIN
Fire Resisting Best Grade House Paint

PYROLIN
Fire Resisting Irown House Paint

PYROLIN
Fire Resisting No. 1 Oxide Paint

PYROLIN
Fire Resisting House Oxide Paint

PYROLIN
Fire Resisting Floor Paint

PYROLIN
Fire Resisting White Spray

PYROLIN
Fire Resisting Factory Interior White

PYROLIN
Fire Resisting Shingle Stain

PYROLIN
Fire Resisting Deodorizer

PYROLIN
Fire Resisting Lubricating Oil

PYROLIN
Fire Resisting Grapholin

PYROLIN
Fire and Heat Resisting Armature Winding Varnish

Pyrolin Guarantee

We Guarantee that Pyrolin Paint, when properly applied, will not crack, chalk or flake off, and will cover, gallon for gallon, as much surface as any first-quality paint now on the market. We guarantee this, in addition to its fire proof quality, to be a strictly pure Linseed Oil, Lead and Zinc Paint.

We Further Guarantee that the longer this paint has been applied the stronger becomes the fire resisting quality.

PYROLIN PRODUCTS COMPANY, INC.

How, When and Where to Use Pyrolin

PYROLIN BEST GRADE LINSEED OIL HOUSE PAINT, as the name indicates, is for the outside of all frame residences. This is also true of IROWN, which is just as fire resisting in its nature as the best grade house paint, but is not made of such high grade material. These paints become more effective in their fire resisting quality the longer they are applied, and after a period of six months, are proof against the spread of flames.

PYROLIN FIRE RESISTING HOUSE OXIDE is an excellent grade of paint and of great fire resisting quality. It is made to compete in price with other high grade paints on the market. In dark colors only. Note guarantee on this paint.

PYROLIN FIRE RESISTING No. 1 OXIDE is beyond question the best paint ever placed on the market for exterior purposes, for barns, sheds and other rough work. Its fire resisting quality is fully equal to that of the best grade, but of course, it contains no lead or zinc pigments. The floor paint dries in from twelve to eighteen hours, and is the only paint of the kind ever made which renders the floor to which applied, proof against the spread of flames from hot coals, or sparks, so often the cause of fire. This article is ten years ahead of any competitor.

PYROLIN FIRE RESISTING WHITE SPRAY is a white spray for the interior of mill constructed buildings, sheds, barns, warehouses, etc., and the longer applied the greater the fire resisting quality. After being applied for a period of thirty to sixty days the outside pigments of this spray could all be scraped off, but the woodwork would retain its fire resisting quality. Largely in use by railways.

PYROLIN INTERIOR FACTORY WHITE. This is the only paint of the kind ever placed on the market. It can be applied only to bare clean woodwork, and will dry hard in one hour after application, and makes the woodwork proof against almost any kind of a blaze that may be applied to it. One coat is sufficient and its action in fire resisting is immediate. Its name indicates that it is made in white, but it may also be had in gray or black, as desired, and is the paint on which the Government made their test. This factory white should be used on all bare woodwork in basements around furnaces, in every home, factory and warehouse, and other buildings where there is the slightest exposure.

PYROLIN FIRE RESISTING SHINGLE STAIN is a creosote linseed oil stain combined with the Pyrolin Liquid, which when applied to shingles either by dipping or by a spray pump, or by a brush, will in the course of sixty to one hundred and twenty days, render the shingles proof against two thousand one hundred degrees of flame, and the longer this stain is applied the more effective becomes the fire resisting quality, which is practically permanent.

PYROLIN LIQUID AND PYROLIN PRODUCTS are preservatives. They will not rot or destroy fabrics or textiles of the most delicate nature, nor will the color run.

PYROLIN FIRE PROOFING LIQUID should be applied to all fabrics such as curtains, children's dresses, burlaps on walls, theatre curtains and all woodwork where paint is not desired.

You May Ask—What is Pyrolin?

We can tell you what Pyrolin does, but not what it is, for that is a secret.

The discoverer of Pyrolin, Mr. G. F. Johnston, Secretary and General Manager of the Pyrolin Products Company, Inc., is the only man in the world who knows what Pyrolin is. It took him nearly twenty years of constant research to discover a product that when applied to wood or any burnable material would make it absolutely fire resisting.

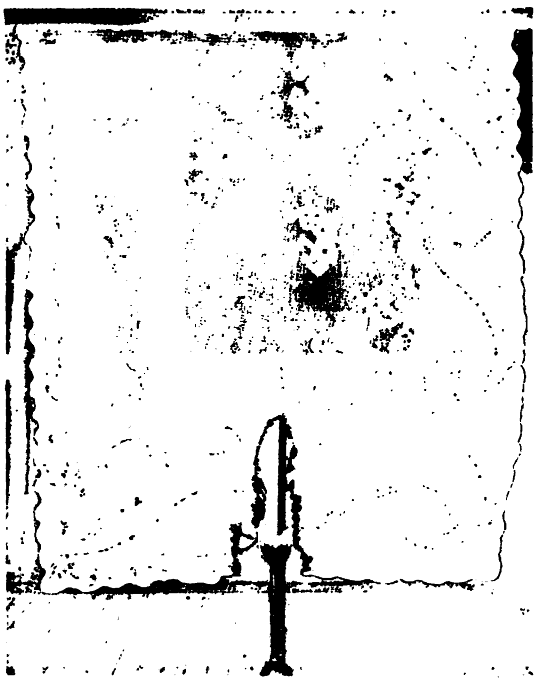
Pyrolin is a clear, transparent liquid. It is absolutely non-poisonous and will not injure the hands or the most delicate fabric. In paint it takes the place of turpentine and renders the surfaces to which it is applied absolutely fire retardant.

Pyrolin Liquid may be used alone. Every home is filled with highly inflammable material, curtains, draperies, etc. These may be made fire proof.

On the following page is an actual photograph of a lace curtain that was treated with Pyrolin Liquid, and afterwards subjected to direct contact with a gas flame.

The photograph was taken after the flame had been in constant and direct contact with the curtain for 228 hours, or nine and one-half whole days and nights. Certainly no more conclusive proof than this could possibly be given of the wonderful fire resisting qualities of Pyrolin Liquid.

Pyrolin Liquid is just as effective in fire proofing any kind of drapery, flags, theatrical scenery, decorations, children's dresses, or any fabric or textile.



In decorating halls, churches, theatres or other public places, flags, bunting and all decorations may easily be rendered fire proof by Pyrolin. On the fourth of July, or other gala occasions, if children's dresses were laundered with Pyrolin all danger of their catching fire would be eliminated.

There are many surfaces that you may not care to paint. Pyrolin Liquid applied to these will render them absolutely fire resisting without affecting their appearance.

Hardwood floors or interior trim, which you may simply want to stain or finish with oil, may be thus treated. Wood walls that are exposed to heat from furnaces or stoves may be treated with a coat of Pyrolin Liquid and made as safe as though built of brick or concrete.

Again, remember that Pyrolin is a transparent and harmless liquid and will not injure the hands or the most delicate fabric.

BECAUSE PYROLIN does stop fire, and there is no better paint made, the demand for this wonderful Paint and Product will be universal. However, it will take some time to get a stock of it in every city and town in the country.

If you are not able to get it in your town or vicinity send direct to the manufacturers. *Address*

Pyrolin Products Co., Inc.
Fort Dodge, Iowa

White Paints From 1907 Fence

The white paints from the 1907 fence may be divided into seven general groups:

1. White Lead. (Basic Carbonate and sublimed.)
2. Lead and zinc.
3. Zinc oxide and inert.
4. Three pigment combinations.
5. Four pigment combinations.
6. Five pigment combinations.
7. Zinc oxide, straight.

The cuts are prepared from actual size photographs taken by the inspectors in 1911 before the test fence panels were re-painted. The first group includes a representative portion of each white lead in the test. The summarized statements for 1910 and 1911 are given and the photograph shows the actual surface condition at the time of repainting.

GROUP I—WHITE LEADS.

Fig. 1. Fair in 1910; good in 1911. White Lead.
Fig. 2. Fair in 1910; fair in 1911. Quick Process. White Lead.
Fig. 3. White Lead. Fair in 1910; good in 1911. 10 gals. primer.
Fig. 4. Sublimed Lead. Medium in 1910; medium in 1911.
Fig. 5. White Lead. 6 gals. primer. Medium in 1910; medium in 1911.

GROUP II—LEAD AND ZINC.

Fig. 6. Very poor in 1910; very poor in 1911. White Lead 50%; zinc 50%.
Fig. 7. Poor in 1910; medium in 1911. White Lead 37%; zinc 63%.

GROUP III—ZINC OXIDE AND INERT.

Fig. 8. Very poor in 1910; poor in 1911. Zinc oxide 64%; barium sulfate 36%.

GROUP IV—THREE PIGMENT COMBINATIONS.

Fig. 9. Very poor in 1910; poor in 1911.

FORMULA:	White lead	48.50%	Linseed oil	83%
	Zinc oxide	48.50	Benzine (2) Turp. (1)	
	Calcium carb.	3.00	drier	17
		100.00		100

Fig. 10. Medium in 1910; medium in 1911.

FORMULA:	White Lead	38%	Linseed oil	91%
	Zinc oxide	48	Turp. & drier	9
	Silica	14		100
		100		

Fig. 11. Medium in 1910; poor in 1911.
Zinc oxide, 73%; silicon oxide 25%; calcium carbonate 2%.

Fig. 12. Very poor in 1910; very poor in 1911.

FORMULA:	White Lead	60%	Linseed oil	91%
	Zinc Oxide	34	Turp. drier	7
	Inert material	6	Water	2
		100		100

GROUP V—FOUR PIGMENT COMBINATIONS.

Fig. 13. Poor in 1910; poor in 1911.

FORMULA:	White lead	44%	Linseed oil	86%

Fig. 14. Fair in 1910; fair in 1911.

FORMULA:			
White Lead	60%	Linseed oil	90%
Zinc oxide	27	White drier	10
Asbestine pulp	10		100
Calcium carbonate	3		
	100		

Fig. 15. Medium in 1910; medium in 1911.

FORMULA:			
Standard zinc lead	30%	Linseed oil	90%
Zinc oxide	40	Turp. Japan drier	8
Sublimed lead	20	Water	2
Calcium carbonate	10		100
	100		

GROUP VI—FIVE PIGMENT COMBINATIONS.

Fig. 16. Medium in 1910; poor in 1911.

FORMULA:	
White lead	37.51%
Lead sulfate	7.84
Zinc oxide	25.87
Calcium carbonate	20.36
Barytes, Silica & undetermined	8.42
	100.00

Fig. 17. Very poor in 1910; very poor in 1911.

FORMULA:	
White lead	38.95%
Lead sulfate	4.81
Zinc oxide	33.58
Calcium carbonate	19.48
Barytes & Silica	3.18
	100.00

Fig. 18. Very poor in 1910; poor in 1911.

FORMULA:			
White lead	25.00	Linseed oil	86.00
Zinc lead	70.00	Turpentine drier	10.66
Mag. silicate	2.00	Water	3.34
Cal. carbonate	3.00		100.00
	100.00		

GROUP VII—ZINC OXIDE STRAIGHT.

Fig. 19. Poor in 1910; poor in 1911. Zinc oxide.

Illustrations From the Paint Tests of 1908

The cuts are reproduced actual size from photographs taken in 19 before the 1908 fence was repainted, and may be classified into six grou as follows:

1. Straight leads.
2. White lead and zinc.
3. Sublimed lead and zinc.
4. Three pigment combinations.
5. Four pigment combinations.
6. Special primers.

Fig. 1. White Leads. Fair in 1910; fair in 1911.
Fig. 2. Tinted yellow. White Lead. Good in 1910; good in 1911.
Fig. 3. Tinted drab. White Lead. Good in 1910; good in 1911.
Fig. 4. English White Lead. Medium in 1910; fair in 1911.
Fig. 5. White Lead. Good in 1910; fair in 1911.
Fig. 6. White Lead (mild process). Poor in 1910; poor in 1911.

GROUP II—WHITE LEAD AND ZINC.

Fig. 7. Good in 1910; very good in 1911.
White lead 75%; zinc 25%.

Fig. 8. Good in 1910; medium in 1911. Drab.
Lead 50%; zinc 50%.

GROUP III—SUBLIMED LEAD AND ZINC.

Fig. 9. Medium in 1910; poor in 1911. White.
Sublimed lead 40%; zinc oxide 60%.

Fig. 10. Poor in 1910; poor in 1911. Grey.
Sublimed lead 60%; zinc 40%.

GROUP IV—THREE PIGMENT COMBINATIONS.

Fig. 11. Medium in 1910; fair in 1911. Drab.

FORMULA:	White Lead	90%
	Sub. Lead	2
	Zinc	7
		100

Fig. 12. Poor in 1910; medium in 1911. White.

FORMULA:	White Lead	45%	Linseed oil	86.07%
	Zinc oxide	45	Turp. & Japan drier	13.93
	Calcium carbonate	10		100.00
		100		

Fig. 13. Poor in 1910; medium in 1911. White.

FORMULA:	White lead	37.09%	Linseed oil	89.47
	Zinc oxide	50.00	Turp. & Japan drier	10.53
	Silica & silicates	12.91		100.00
		100.00		

GROUP V—FOUR PIGMENT COMBINATIONS.

Fig. 14. Poor in 1910; poor in 1911. White.

FORMULA:	Zinc oxide (leaded)	57.14%	Linseed oil	85.58%
	White lead	28.58	Turp. & Japan drier	13.01
	Calcium carbonate	7.14	Water	1.41
	Magnesium silicate	7.14		100.00
		100.00		

GROUP VI—SPECIAL PRIMERS.

Fig. 15. Shows relative effect of ochre primer on white. Straight lead.

Fig. 16. Shows effect of ochre primer more marked than on preceding. Lead and zinc.

Fig. 17. Shows relative effect of orange shellac primer on white and drab. White lead on white and drab is lead and zinc.

Fig. 18. Shows relative effect of orange shellac primer on white and drab; the white, being white lead and zinc, and the drab, white lead.

Fig. 19. Good in 1910; good in 1911. Primer and second coat white lead; third coat 75% white lead, 25% zinc oxide.

Fig. 20. Outside White.

FORMULA:	White lead	58.76%	Linseed oil	90.6
	Lead sulfate	2.22	Volatile oil	7.3
	Zinc oxide	33.92	Water	2.1
	Calcium carbonate	1.24		100.00
	Alumina	1.54		
	Silica	1.76		
	Magnesia & Undet.	.56		
		100.00		

Further comments are unnecessary for the photographic cuts tell their own story better than descriptive words.

Photographs of White Paint From 1907 Fence

GROUP I—WHITE LEADS.

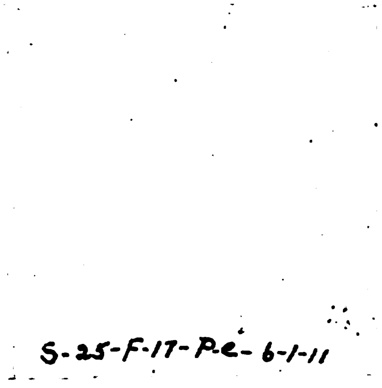


Fig. 1. S-25-P-e.

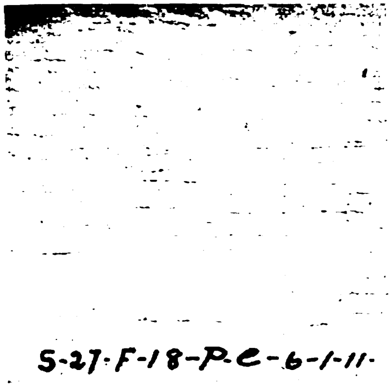


Fig. 2. S-27-P-e.

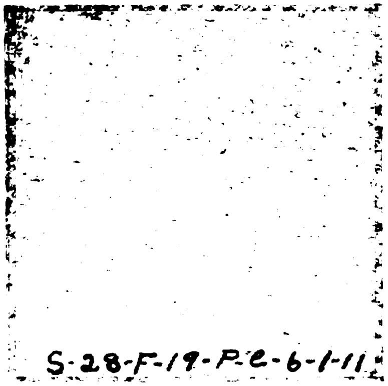


Fig. 3. S-28-P-e.

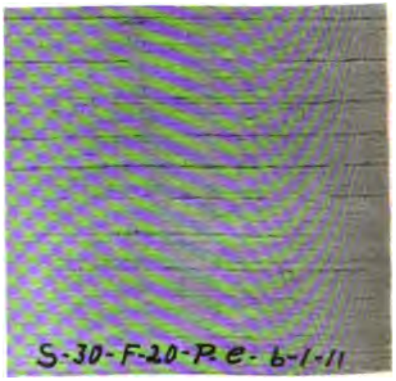


Fig. 4. S-30-P-e.

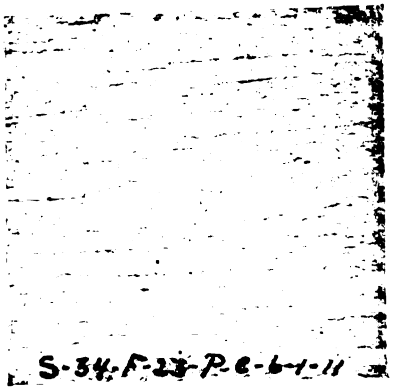


Fig. 5. S-34-P-e.

GROUP II—LEAD AND ZINC.

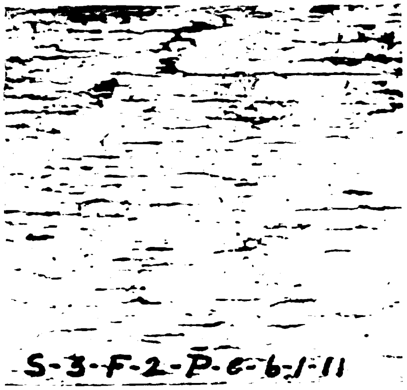


Fig. 6. S-3-P-e.

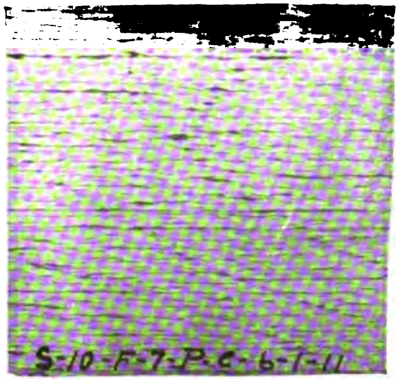


Fig. 7. S-10-P-e.

GROUP III—ZINC OXIDE AND INERT.

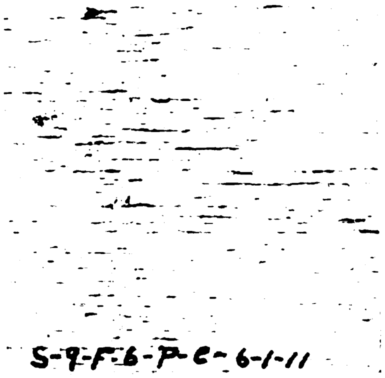


Fig. 8. S-9-P-e.

BER
LARGEST V
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NEW YORK.
262 Pearl Stre
PHILA

CINCINNATI,
323 5th Avenu

GROUP IV—THREE PIGMENT COMBINATIONS.

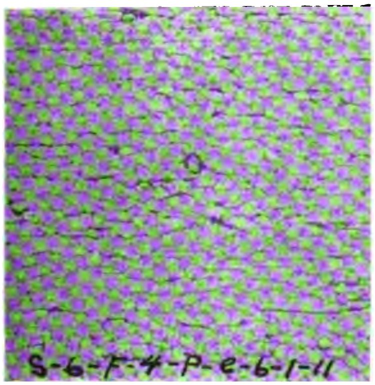


Fig. 9. S-6-P-e.

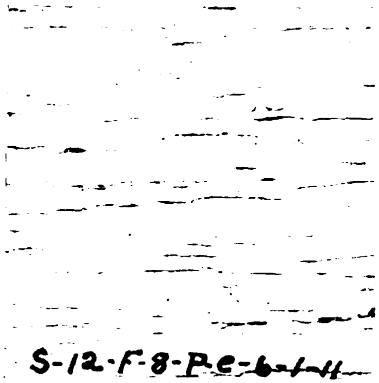


Fig. 10. S-12-P-e.

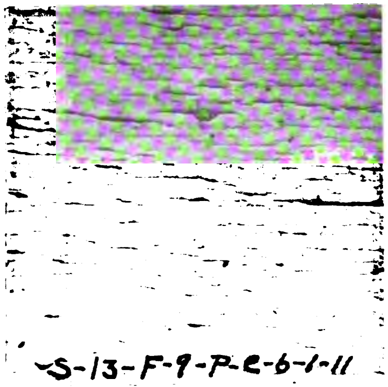


Fig. 11. S-13-P-e.

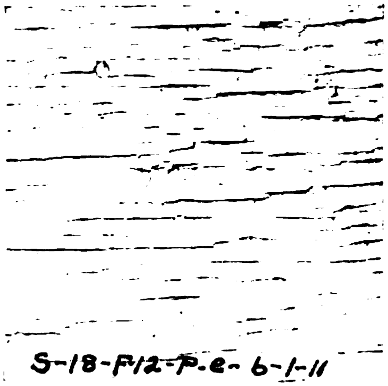


Fig. 12. S-18-P-e.

GROUP V—FOUR PIGMENT COMBINATIONS.

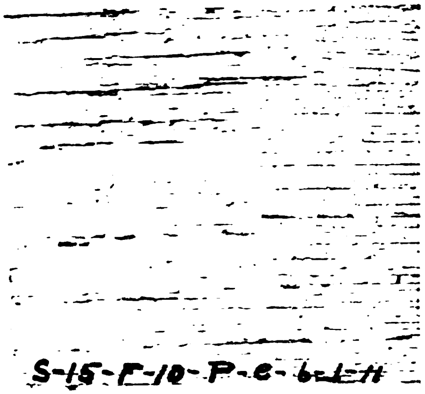


Fig. 13. S-15-P-e.

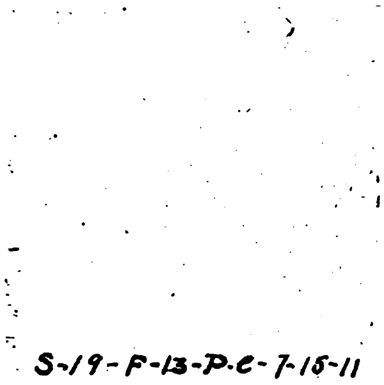


Fig. 14. S-19-P-e.

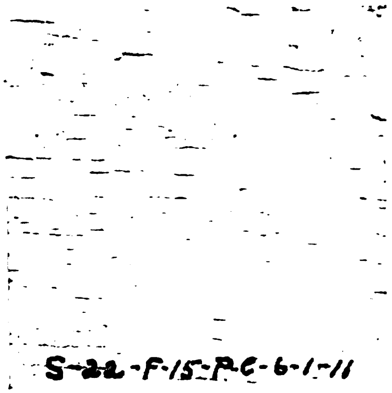


Fig. 15. S-22-P-e.

GROUP VI—FIVE PIGMENT COMBINATIONS

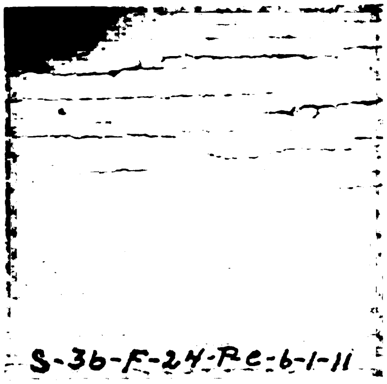


Fig. 16. S-36-P-e.

Fig. 17. S-37-P-e.

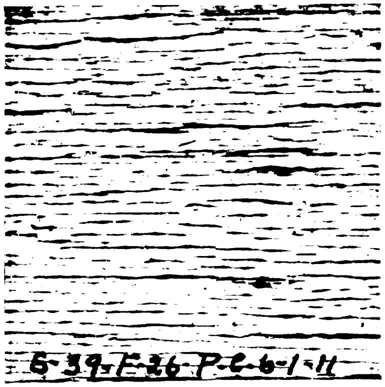


Fig. 18. S-39-P-e.

GROUP VII—ZINC OXIDE STRAIGHT

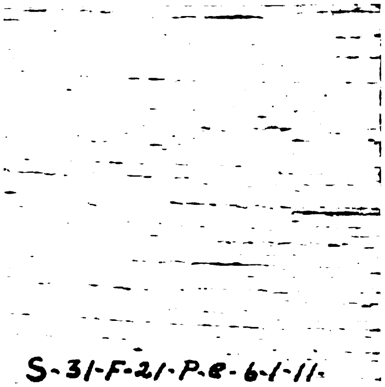


Fig. 19. S-31-P-e.

Photographs Showing Paints on 1908 Fence

GROUP I—WHITE LEADS.

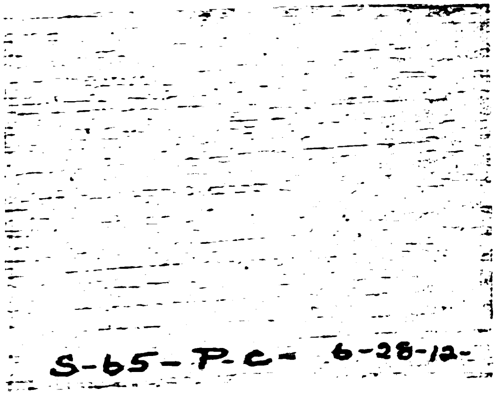


Fig. 1. S-65-P-c.

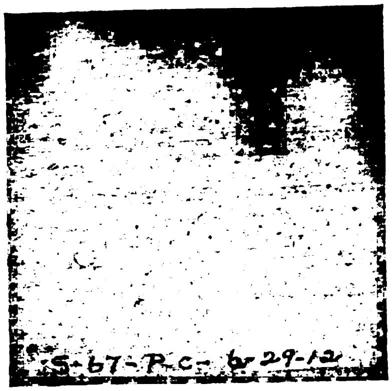


Fig. 2. S-67-P-c.

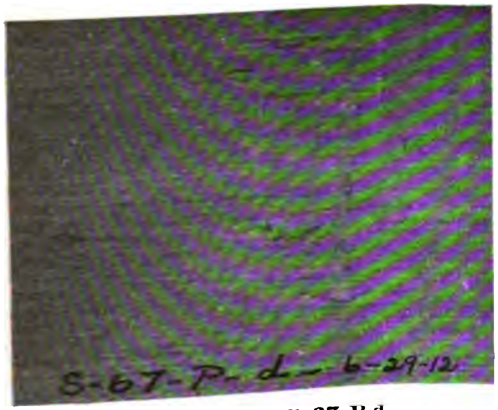


Fig. 3. S-67-P-d.

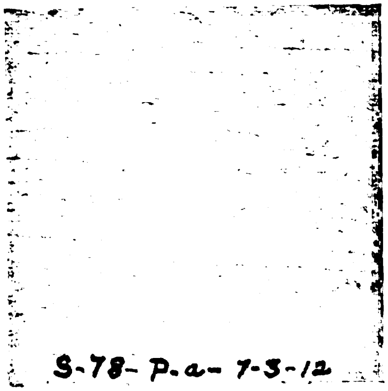


Fig. 4. S-78-P-a.

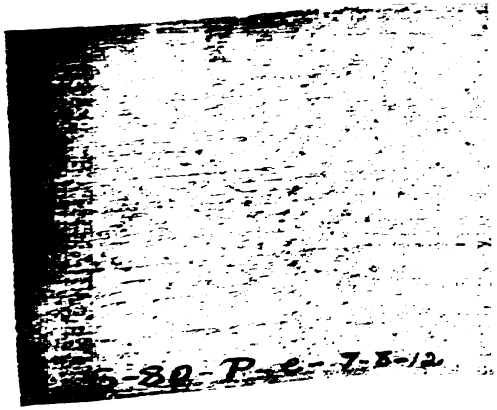


Fig. 5. S-80-P-e.

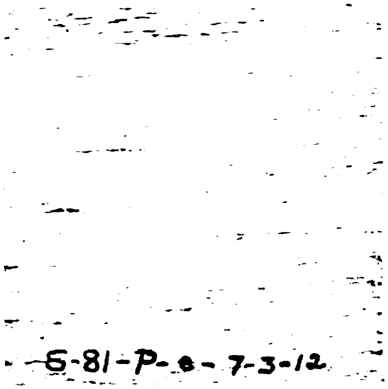
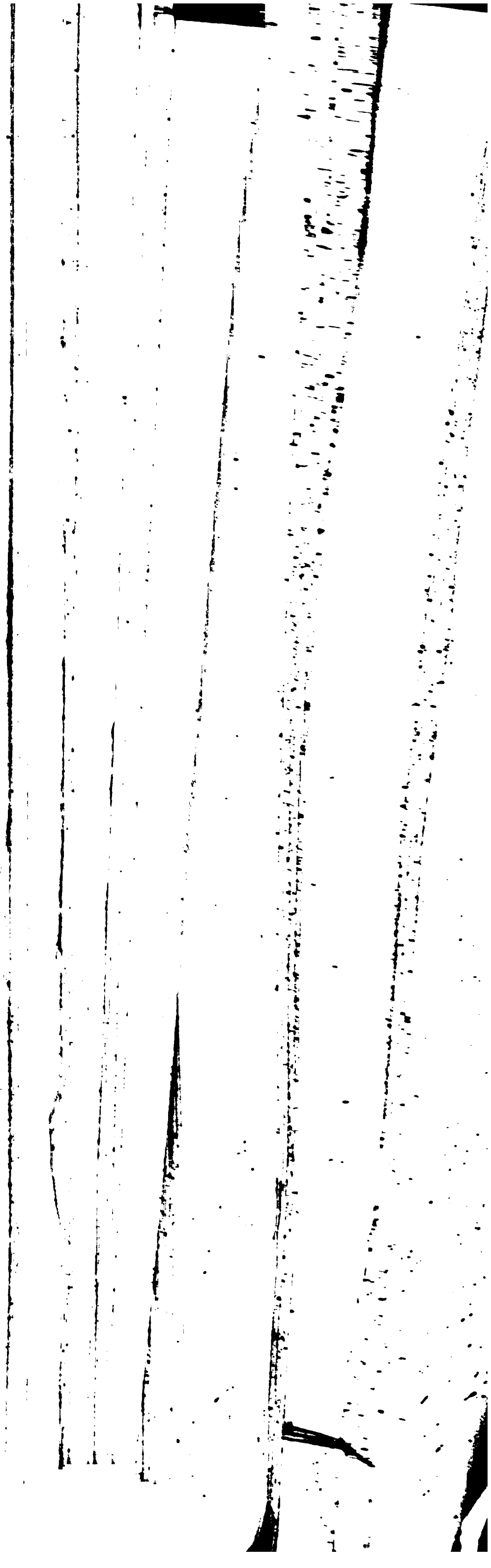


Fig. 6. S-81-P-e.



GROUP II—WHITE LEAD AND ZINC.

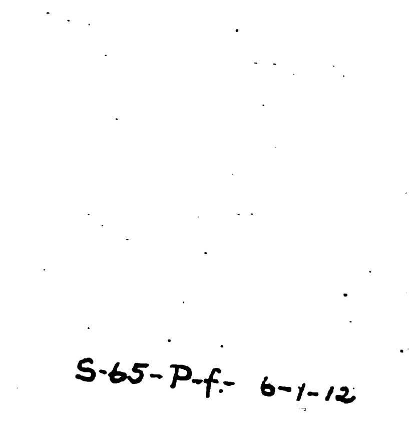


Fig. 7. S-65-P-f.

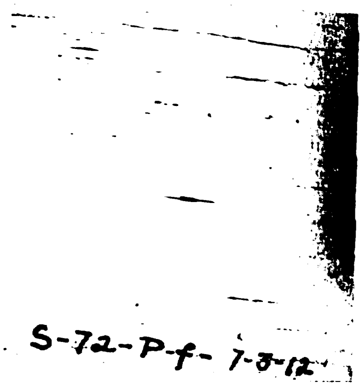


Fig. 8. S-72-P-f.

GROUP III—SUBLIMED LEAD AND ZINC

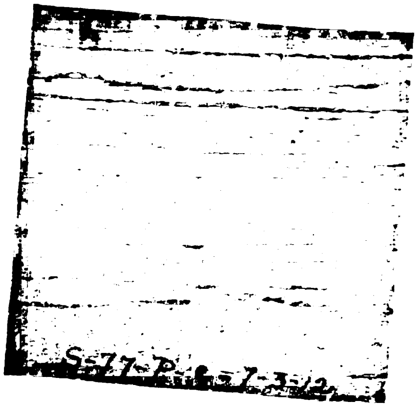


Fig. 9. S-77-P-e.

Fig. 10. S-79-P-f.

GROUP IV—THREE PIGMENT COMBINATIONS

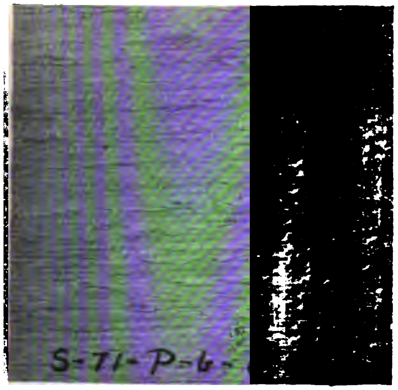


Fig. 11. S-71-P-b.

Fig. 12. S-75-P-e.

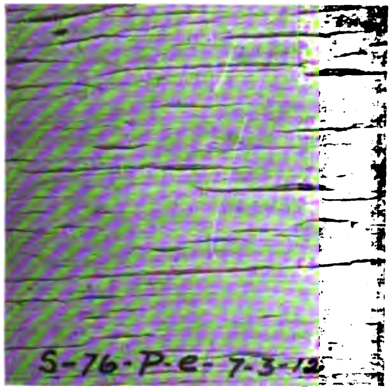


Fig. 13. S-76-P-e.

GROUP V—FOUR PIGMENT COMBINATIONS.

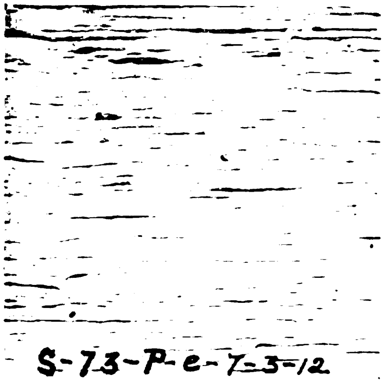


Fig. 14. S-73-P-e.

GROUP VI—SPECIAL PRIMERS.

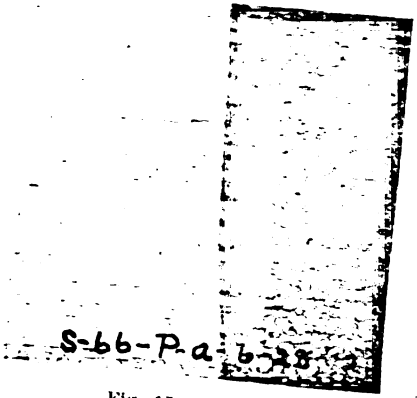

S-66-P-a-6-28-12

Fig. 15. S-66-P-a.

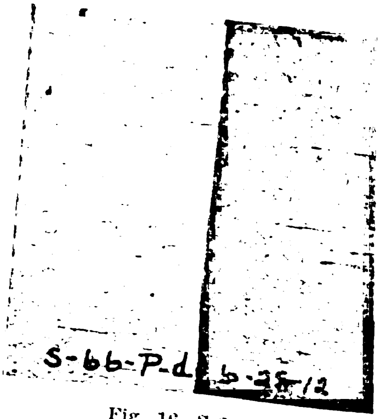

S-66-P-d 6-28-12

Fig. 16. S-66-P-d.

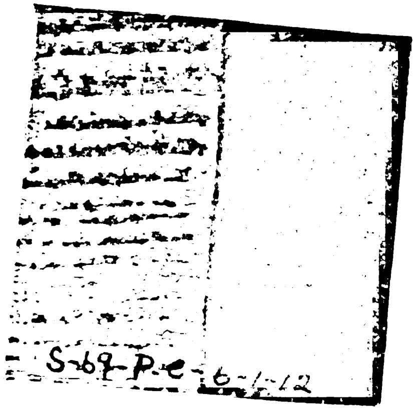

S-69-P-e-6-1-12

Fig. 17. S-69-P-e.

S-69-P-f-6-1-12

Fig. 18. S-69-P-f.

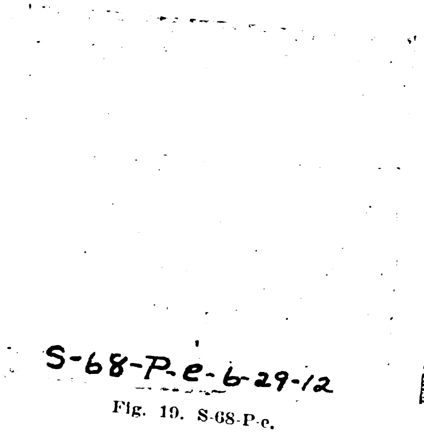

S-68-P-e-6-29-12

Fig. 19. S-68-P-e.

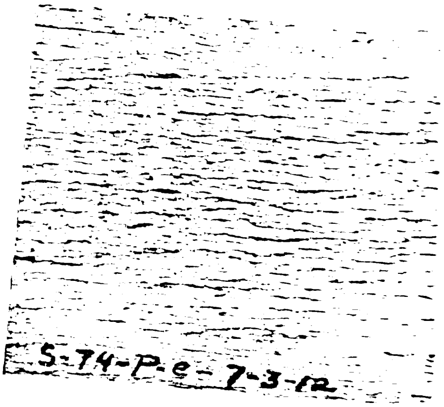

S-74-P-e-7-3-12

Fig. 20.

4

NORTH DAKOTA AGRICULTURAL COLLEGE

GOVERNMENT AGRICULTURAL

EXPERIMENT STATION

OF

NORTH DAKOTA

Bulletin No 86.

SOME READY MIXED PAINTS

BY

E. F. Ladd and G. A. Abbott

Any farmer, teacher, or student in the State may have this Bulletin
mailed to his address, free of charge, upon application.

FARGO, NORTH DAKOTA, U. S. A.
December, 1909.

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SOME READY-MIXED PAINTS

By E. F. LADD and G. A. ABBOTT

For a number of years the Department of Chemistry has made it a point to examine the chemical composition and character of the paints found upon the market, and in 1905, acting under the instructions of Director J. H. Worst, the Department began a systematic study, not only to determine the composition of paints, paint producing materials, white leads, oils and varnishes, but also in making certain practical tests in the application and use of paints under known conditions and under such conditions as are met with in the painting of buildings. This work has been continued throughout the entire period and the experiments as outlined will probably cover five or six years more of time.

We have examined and tested paints found not only upon the market in North Dakota, but have gathered samples from other parts of the country and even imported from Europe in order that we might gain a better knowledge of the character of paints as used in all parts of the country. Three bulletins, Nos. 67, 70 and 81 have already been published giving information with regard to paints, as well as some data presented in our Annual Reports.

When the Paint Law was enacted in North Dakota in 1905, we found our state flooded with paints of very inferior character, and many of the better classes of paints were being driven from the market. Catalog-house paints and paints produced by many agencies handling cheap paints and selling direct to the consumer, were in general use. There was a great deal of complaint with regard to the character of the paint then sold. The enforcement of the Paint Law has done much to change this condition, and to-day probably no state in the Union has as high grade paints on its markets as are to be found in North Dakota, although our state law does not bar the sale of any class of paint when it is truthfully labeled. The manufacturer of the "dope" paint has been obliged either to withdraw from the state or produce a better article.

It has been repeatedly said, since our Paint Law went in force, that practically all the bad paints were being made in the West, and it is true that those given in bulletins Nos. 67 and 70 were western paints in the main, but at that time we had made no examinations of eastern paints. Manufacturers of mixed paints in the East have fought the enactment of paint laws and insisted that it would work a hardship upon them to be obliged to give away the formula of their paints, which had taken a life-time to work out and develop; that there was no necessity for paint laws in the eastern states, as was the case in the new West, where unscrupulous manufacturers had taken advantage of the people to place inferior products upon the market. This did not seem creditable and, being confronted with a statement of this kind when in Washington to appear before a committee of Congress giving a hearing with regard to a national paint law, the writer decided that he would take up various paints representing eastern manufacturers, examine them, and find out whether or not the West was the home of the "dope" paint, or whether the East was equally afflicted with this evil.

If we compare the results as given in this bulletin with those given in bulletin No. 70, we shall find that at no time have there been paints of so low grade and so adulterated produced and sold in the West as are to be found in the eastern states. In the judgment of the writer, if the West stood in need of a law to protect the people against adulterated paints, deception and fraud, the East likewise needs the same protection. The consuming public are entitled to such protection and for their benefit we give the analyses of the various paints which have been gathered under the direction of the North Dakota Agricultural Experiment Station as representing certain types of paint produced in the East. Not all of the paints are to be included in the "dope" class, for we have taken those paints which have come to us through the process of gathering, including the paints of certain western manufacturers which had not previously been reported upon.

Most of the analyses have been made by Dr. Abbott; a few were made by my former assistant, Professor Holley, and two or three of the analyses were made by the late Professor Wood.

In the analyses as given, the term "lead sulphate" occurs; undoubtedly, the product used in some instances, but not in all cases, was sublimated lead. Some of the manufacturers have protested that certain ingredients found in their paints were not used by them, but they have not been able to show that the commercial products employed are chemically pure; in other words, that they did not contain foreign ingredients in the case of, for example, asbestine, or in the case of magnesium silicate. It is undoubtedly true that some of the silica was not in combined form to be classed as belonging to the mineral constituent, of which it is supposed to be a part.

There has been complaint at times that too large a proportion of water has been found, and that the method of analysis employed must have been such as to decompose and set free the water of crystalization. Such a thing might be possible under antiquated methods of analysis, but certainly not under the methods as employed in this Laboratory, where only the water in the liquid portion of the paint is taken into account. Whatever may have been considered as water of crystallization has remained as such combined with the pigment. Several of the paints contained water far in excess of anything that was found in paints previously analized and reported in bulletin No. 70, while the proportion of benzine was often large.

While there has been a great deal said of late with regard to benzine as a substitute for turpentine, in the opinion of the writer benzine is no substitute for turpentine and should not be so considered. It may become necessary to make use of benzine in cheaper paints, but in our experiments thus far conducted, it has shown itself vastly inferior to the turpentine ordinarily used in paints.

The time has come when the people are demanding that they have truthful information with regard to what each paint is composed of, and they are willing to pay for what they receive. This, we believe, is as true for the eastern consumer as for the western consumer, who has become more familiar with the composition of paints. No honest manufacturer has anything to fear from putting a label upon his paint; and unless the manufacturer is mislead, if he opposes paint legislation requiring the percentage composition to be shown, you may rest assured that he has something somewhere to cover up which he does not care to have the general public know about.

The argument which has so often been put forth that the label formula is giving away secrets, is not true, for there is not a large paint manufacturer in the country who does not already know the composition of his competitors' paint, and the consuming public are fast becoming familiar with the ingredients used in the manufacture of paint and the difference between adulterants, cheapeners and paint ingredients.

The Eastern Paint Manufacturers' Association, at a meeting held in New York, are reported to have considered the matter of paint legislation, and after considerable discussion to have unanimously adopted the following resolutions:

> "RESOLVED, That, after a year's trial, experience and expense in opposition to formula labeling legislation, we hereby re-affirm our position of a year ago to the effect that we believe that such legislation is pernicious and unjust to the trade generally; and be it
>
> "FURTHER, RESOLVED, That we will continue to oppose such legislation.
>
> "RESOLVED, That, in order to secure a more uniform practice in the trade in reference to weights and measures, and also to guard against misrepresentation, this Association goes on record as favoring a law, both State and National, requiring net weights and full measures and providing against misbranding and mislabeling."

From this we are to infer that the eastern manufacturers do not care to have the public know of what their paints are composed. They admit that short weights and measures have been a prevalent practice in the past, and, since the abuses have become so great and to their inconvenience, they desire the State and Nation to regulate this feature through law. They would also provide against misbranding and mislabeling; that is, they would not allow a man to call his paint "white lead" when in reality it was made of barytes, zinc, chalk, etc. They would, however, allow him to adopt a name for his paint, such as "Jones Standard White," put in all the inert material of any kind or character he might choose, dope it with benzine, load it down with water, as some of them have been doing and are still doing, and leave the public in ignorance of the facts. In other words, they would correct those evils which are bothering them, but would afford no protection to the consumer of their paints. If these manufacturers believe that the public is going to permit such practices to continue long without interference on their part, they have misread the signs of the time. If we are to judge by the letters received from some of these eastern manufacturers, however, it is more than likely that some of them, before any legislation is enacted, desire to change their formulas, gradually get rid of the "dope" paints which they have made and get them off the market. Others, more indifferent to the demands of the public, would continue the practices which they have followed in the past by defrauding the public and in this way largely driving from the market all of the reputable paints, for no honest manufacturer can hope to compete with one whose paint is largely composed of inert material and adulterants, and the liquid part of which is composed of from 40 to 50 per cent of water and benzine.

As one looks over the analyses given in the following pages, it will be observed that a large number of paints contain considerable in excess of ten or 15 per cent of inert material. While there are manufacturers who have maintained that five per cent of inert material is of advantage in mixed paints, since it tends to correct the acidity in the oil or other paint ingredients, thus preventng deterioriation of the oil, it cannot be said that these large proportions are necessary for this purpose, or that they are used for any other purpose than to reduce the cost of the paint. It is hard, however, to follow the logic of such arguments and to harmonize these with known chemical facts. More often, it may be truthfully said that they are used as adulterants, and when used in connection with water and benzine, they may be safely classed as such.

The Department has felt that water, not to exceed two per cent in the liquid portion of the paint, is not necessarily to be considered as a serious adulterant, but when more than this amount is used, the question may be asked what the reason is for incorporating it in the paint vehicle.

BRANDS OF PAINT HAVING FIFTEEN PER CENT AND OVER OF INERT MATERIAL

In the following table we have arranged a list of those paints containing more than fifteen per cent of what is usually termed as "inert material." We have not included white lead, lead sulfate (sublimed lead), zinc oxide, color or undetermined matter; all other ingredients in the pigment have been classed as inert material. We have not, however, mentioned those brands of paint which carry large quantities of benzine and water and which, to a considerable extent, in cheapening paints, may be said to take the place of the inert material in the pigment, so far as barytes and chalk are concerned.

We have, therefore, arranged in order of per cent, all those brands of paints where the amount of inert material is in excess of fifteen per cent.

Station No.	BRAND	Per Cent
482	Cottage Colors, Hammonds' Paint Works	16.82
512	Gloss Paints, Lucas & Co.	16.91
509	Gloss Paints, Lucas & Co.	17.13
477	Gloss Paint, Lucas & Co.	21.97
513	Glass Paints, Lucas & Co.	23.31
326	Roger's Best Ready-Mixed Paints, Grey	25.28
488	Highland Mixed Paint, Highland Color Co.	26.12
325	Rogers' Best Ready-Mixed Paint, White	27.75
475	Shawmut Mixed Paint, Briggs & Co.	29.54
476	Moore's House Color	29.59
474	Derby Mixed Paint, Prince Paint Co.	32.20
484	Queen Anne, W. Snelling	32.62
485	Shawmut Outside, John Briggs & Co.	33.49
501	Standard Mixed Paint, Woolsey Paint & Color Co.	33.93
381	Ruchter's Durable Paint	37.69
496	Shawmut Mixed Paints, Briggs & Co.	45.52
502	National Mixed Paint, National White Lead & Color Co.	46.07
404	Chase's Ready-to-Use Paint	49.32
473	Commercial Mixed Paint, A. E. White & Co.	50.85
479	Body White, General Lead Co.	54.77
499	Metropolitan Brand, Metropolitan Paint Co.	55.89
495	Queen Anne Paint, Hoffman Co.	56.70
489	Iveroid Liquid Colors, Iveroid Paint Co.	58.23
509	Metropolitan Paint, Metropolitan Paint & Varnish Co.	59.78
494	Iveroid Liquid Colors, Iveroid Mixed Paint Co.	61.87
492	Derby Mixed Paint, Prince Paint Co.	67.20
491	Highland Mixed Paint, Highland Color Co.	76.75
327	Powder Paint, A. L. Rice	100.00
409	Mephisto Barn Paint	100.00

In bulletin No. 67 we quoted from a number of paint manufacturers with regard to the use of adulterants in the vehicle, or liquid portion, of the paint; and very generally they condemned the use of water. In summing up we said:

> "We have quoted from the paint men themselves in order to show that those, who have spoken upon the subject, condemn the use of substitutes for linseed oil. These paint men say that they will not be responsible for the results if anything but pure linseed oil is used in reducing paints."

If this is true, then why should the paint men dope their paint with water, alkali, etc.? In other words, if water and alkali are not good enough for the consumer to use, why should the paint man use these constituents in their manufacture? If water and alkali constitute a fraud, why should not the public know it and have an opportunity to judge of the character of the paint they desire to use?

Many of the paints mentioned in this bulletin were found to contain benzine in an unusually large proportion. Considering only the water for the time being, arranging the paints in the order of the proportion of water contained in the vehicle, excluding all below five per cent, we have as follows:

Station No.	BRAND	Per Cent
325	Rogers' Best Ready-Mixed, White	5.24
475	Shawmut Mixed Paint	7.34
501	Standard Mixed Paint	8.20
476	Moore's House Colors	9.06
326	Rogers' Best Ready-Mixed, Grey	9.75
326A	Rogers' Best Ready-Mixed	10.21
496	Shawmut Mixed Paint	13.52
484	Queen Anne, White	17.87
490	Iveroid Liquid Colors	20.32
495	Queen Anne Paint	22.09
494	Iveroid Liquid Colors	23.94
474	Derby Mixed Paints	25.16
492	Derby Mixed Paint	30.41
508	Ingersoll's Liquid Rubber Paint	36.75
478	Ingersoll's Liquid Rubber Paint	36.87
409	Mephisto Barn Paint	39.51

It will thus be observed that of the paints so far examined, sixteen of them contain water in excess of five per cent and that several of the paints run above thirty per cent, or even as high as forty per cent of the liquid portion.

The paint vehicle which contains 39.51% of water, also contains 40.87% of benzine, and even the remaining 19.62% of oil is not to be classed as pure linseed oil.

Is it any wonder then that the farmers, who have been the largest users of these mixed paints, have complained of the character of the same? Is it any wonder, even where a good grade of paint and linseed oil have been used over a dope, such as we have described, that the results have not been satisfactory? We must not blame the paint applied unless we know that the paint previously used was of good quality and left a foundation on which a good paint could stand.

As fast as the analyses were completed for the various paints and paint products reported upon in this bulletin, the results of the analyses were submitted to the manufacturers, so far as their name and address were known to this Department. In some instances no reply was received, indicating that there was nothing to be said by the manufacturer with regard to the results of our findings. In other cases, the manufacturers replied, and it will be interesting to consider some of the statements made, especially in the light of the analyses and further correspondence with the parties. For obvious reasons it has not seemed best to give the names of the correspondents, but to quote from their letters which are on file in my office.

One manufacturer says:

> "It is very evident that the sample of paint referred to was manufactured and sold previous to January 1st, 1909. Goods manufactured since that date carry an entirely different label. You will no doubt understand that ——— paint is our second grade. We would like to ask if you have ever examined a sample of our best grade of prepared paint."

It is very evident, therefore, that they manufacture products varying in quality, for the same brand of paint we found to contain very different proportions of various ingredients, including water.

One would expect that a paint made by a firm with a name like the National White Lead & Color Company would have at least as a basis a considerable portion of white lead, but reference to sample No. 502 clearly indicates that no white lead was used in the preparation of the paint, and that benzine entered to a considerable extent into the vehicle.

One manufacturer objected to the analyses and stated that the dry pigment in his paint contained 25% of carbonate of lead, and if there was any benzine it was a small trace that comes from the liquid dryer, which is practically a pure turpentine dryer. He stated that they use calcium sulfate, but no calcium carbonate.

Now, as a matter of fact, the paint contained no white lead, about 20% of lead sulfate, and over 8% of water. It also contained 12% of calcium carbonate as against less than 9% of gypsum. Replying to the manufacturer, I stated:

"Possibly you have changed your formula and this might account for such discrepancies. I might say, however, that I have an analysis of your paint made by another chemist in the East, and he reports, lead sulfate 14%, whereas you say you use nothing but white lead."

A re-examination of the paint bore out the findings of the first analysis and inasmuch as no reply was received from the manufacturer, it is assumed that he does not care to offer further evidence on these disputed points.

Says another manufacturer in reply to our report:

> "Without presuming to question your duties in your position, we are at a loss to understand why you should have occasion to examine our paint and also to publish your findings, when the ——— paint is not offered for sale, nor is ever likely to be offered for sale in North Dakota.
>
> "To publish your findings at this time when, in order to be in line for any legislation that may come in the East similar to your state, we have started in to eliminate what you call 'objectional properties' and make paint more in line with pure paints, seems hardly a fair proposition."

This paint was found to contain 30% of water. It is little wonder then that the manufacturer desired to revise his formula before the public became familiar with the ingredients entering into its make-up. The paint was also short in measure.

Another manufacturer, in commenting upon the analysis, stated that the can must have been mislabeled, and submitted a formula concerning which they say:

> "This formula differs from the one we used last year only in that we have substituted carbonate of lead for sulfate of lead. This will indicate that our paint is made from one-third carbonate of lead, one-third oxide of zinc, and one-third gypsum or calcium sulfate, fully hydrated and mixed in strictly pure linseed oil, and no water whatever."

A re-examination of their paint showed but slightly different results from the first analysis. There was present in the vehicle 9 per cent or more of water. They further state that they cannot see how we get calcium carbonate as they use only calcium sulfate. Nevertheless, the product is not a pure ingredient and there is present about one-third of the lime as carbonate and two-thirds as sulfate.

Since the other manufacturers made no reply to the reports submitted, it is to be assumed that they have no criticism to make. As stated elsewhere, there is no address given for the paint manufactured by the Highland Color Company and thus far we have not been able to trace this product to any manufacturer.

Since the above was written, correspondence has developed to show that Wadsworth, Howland & Co. Boston, Mass., are the makers.

Lab. No. 325. Rogers' Best Mixed Paint, Outside White. Detroit White Lead Works.

Guarantee:	50%	White Lead (½ carbonate, ½ sulfate)
	25%	White Zinc (oxide)
	25%	Blanc Fixe (sulfate of barium)
Thinners:	84%	Linseed Oil
	4%	Linsolene (mostly water)
	12%	Dryer (turpentine and naphtha)

Analysis showed this product to contain:

Capacity of can	1.08 quarts
Contents of can	.99 quarts
Net weight	4 lbs. 7 ozs.
	Per cent
Vehicle	36.12
Pigment	63.88
	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	82.41
Dryer	12.35 *
Water	5.24
Total	100.00

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* Turpentine, 42 parts; benzine, 58 parts.

ANALYSIS OF PIGMENT

	Per cent
White lead	23.27
Lead sulfate (sublimed lead)	21.71
Lead oxide	4.01
Zinc oxide	27.18
Calcium carbonate	.57
Barium sulfate	22.98
Undetermined	.28
Total	100.00

Lab. No. 326. Rogers' Best Ready Mixed Paint, Grey B-15.

Guarantee: The white base in tints where white is used is composed of:
50% White Lead (½ carbonate, ½ sulfate)
25% White Zinc (oxide)
25% Blanc Fixe (sulfate of barium)

100.00%

Thinners: 88.79% Linseed Oil
3.34% Linsolene (mostly water)
7.87% Dryer (turpentine and naphtha)

The analysis of this product showed as follows:

Capacity of can	1.08 quarts
Contents of can	.98 quarts
Net weight	3 lbs. 8 ozs.

	Per cent
Pigment	57.00
Vehicle	43.00
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	82.20
Dryer	8.05**
Water	9.75
Total	100.00

**Turpentine 22%, benzine 78%.

ANALYSIS OF PIGMENT	Per cent
White Lead	23.31
Lead sulfate (sublimed lead)	19.06
Lead oxide	5.98
Zinc oxide	25.94
Calcium carbonate	3.21
Barium sulfate	22.07
Color and undetermined	.43
Total	100.00

Manufacturers claim that only 4.5% of water is used, and give a sworn statement on this point.

In order to test further the question as to the amount of water present, a second sample was procured and marked Lab. No. 326A, for the purpose of determining the amount of the several constituents in the vehicle, with results as follows:

ANALYSIS OF VEHICLE	Per cent
Linseed oil	82.66
Dryer	7.13
Water	10.21
Total	100.00

It will thus be observed that the per cent of water is found higher in the second sample than in the one previously examined. It is, therefore, assumed, since the methods employed for the determination of the water present have shown very satisfactory results, that the analysis truly represents the water content of the liquid portion of the paint.

Lab. No. 327. Powder Paint, Red Tint. Manufactured by A. L. Rice, Adams, N. Y. Sample was submitted for analysis.

	Per cent
Moisture and combined water	5.74
Nitrogenous matter (like casein)	14.59
Color (mainly iron, Fe_2O_3)	19.26
Soluble alumina, Al_2O_3	1.24
Lime sulfate	21.53
Lime, CaO	7.60
Magnesia, MgO	8.74
* Alumina, insoluble, Al_2O_3	.65
Silica, SiO_2	20.65
Total	100.00

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* Probably magnesium silicate.

Some tests made with this paint gave indications as follows:

When mixed with water the paint settles in a few minutes to a hard, cement-like substance. When applied over a wood surface, gives a coating rather permeable to water and, hence, would be apt to disintegrate rapidly. Being very strongly alkaline, if applied over a previously painted surface, would be apt to cause peeling from the reaction on the old paint. The paint would not give a desirable surface for repainting with an old paint. The average cost of the constituents, exclusive of the nitrogenous or casein-like constituents, averages one cent per pound, while the selling price is given as ten cents per pound.

Lab. No. 333. Masury's Liquid Colors, Outside White. J. W. Masury & Son, New York and Chicago. Warranted pure linseed oil paint; no chemical combination or soap mixture.

Capacity of can	1.02 quarts
Contents of can	.98 quarts
Net weight	3 lbs. 13 ozs.

	Per cent
Vehicle	38.9
Pigment	61.1
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	87.00
Dryer	10.5 *
Water	2.5
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White Lead	44.36
Lead sulfate	.62
Zinc oxide	54.79
Undetermined	.23
Total	100.00

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* Dryer mostly turpentine.

Lab. No. 381. Ruchter's Durable Paint. A. A. Eberson & Co., St. Louis, Mo. White Exterior, Interior. The contents of this package is composed of:

55% Zinc White (oxide of)
45% Lead White (sulfate of)

Ground thick in pure, refined linseed oil and enough coloring matter added to produce a tint to match the shade shown on our color card.

Capacity of can	1.02 quarts
Contents of can	1.00 quarts
Net weight	4 lbs. 12 ozs.

	Per cent
Vehicle	17.54
Pigment	82.46
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate	19.14
Zinc oxide	42.47
Silica, SiO_2	11.70
Calcium carbonate	25.99
Undetermined	.70
Total	100.00

Not sufficient vehicle to enable careful determination to be made.

Lab. No. 402. Masury's Liquid Colors, Neutral Grey. J. W. Masury & Son. Guarantee: Pure Linseed Oil paint, no chemical combination or soap mixture. Our examination showed:

Capacity of can	1.03 quarts
*Contents of can	.95 quarts

	Per cent
Pigment	58.10
Vehicle	41.91
Total	100.00

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* Can was slightly leaky, making possible a loss of oil.

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	88.9
Dryer	10.9
Water	.2
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	40.33
Lead sulfate	.68
Zinc oxide	58.15
Color and undetermined	.84
Total	100.00

Lab. Nos. 404 and 405. O. L. Chase Ready-to-Use House Paint. Outside White. O. L. Chase, The Paint Man, St. Louis. "My $100.00 Cash Guarantee: I guarantee under $100.00 cash forfeit that the paint in this can does not contain water, benzine, whiting or barytes, and that my Olio is pure old-fashioned linseed oil and contains absolutely no foreign substance whatever."

	No. 404 Can of Pigment	405 Can of Olio
Capacity of can	1.96 quarts	1.88 quarts
Contents of can	1.82 quarts	1.84 quarts
Net weight	7 lbs. 15 ozs.	
Vehicle	21.1 %	
Pigment	78.9 %	
	100.00	

ANALYSIS OP VEHICLE

	Per cent
Linseed oil	91.8
Dryer	8.2
Water	none
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Silica, SiO_2	49.32
Zinc oxide	46.72
Lead sulfate	3.20
Undetermined	.76
Total	100.00

While it is true that this product does not contain water, benzine, whiting or barytes, neither does it contain white lead, but is made up of, approximately, 50 per cent of silica.

Lab. No. 409. Mephisto Barn Paint. Name and address of manufacturer not given.

Capacity of can	3.90 quarts
Contents of can	3.66 quarts
Net weight	9 lbs. 7 ozs.

	Per cent
Vehicle	61.9
Pigment	38.1
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Water	39.51
Benzine	40.87
Oil (mostly linseed)	19.62
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Combined water and organic matter	4.73
Silica, SiO_2	1.45
Iron, Fe_2O_3	16.70
Calcium sulfate	26.26
Calcium carbonate	50.69
Undetermined	.17
Total	100.00

This paint was very poorly emulsified. (While the name of the manufacturer is not given, correspondence with the Armstrong Paint & Varnish Works of Chicago indicated that they were the producers of this paint.)

Lab. No. 420. Mixed Paint. (No. 1 Color.) Spokane Liquid Paint. Guarantee: Strictly Pure. Jones & Dillingham, Spokane, Wash.

Capacity of can	1000 c. c.
Contents of can	1000 c. c.
Weight per gallon	14.44 lbs.

	Per cent
Pigment	56.21
Vehicle	43.79
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	95.07
Dryer (turps and benzine)	3.10
Moisture	1.83
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Zinc oxide	30.99
White lead	29.60
Calcium carbonate	2.44
Lead sulfate	36.02
Undetermined	.95
Total	100.00

Lab. No. 421. Outside White. 100% Pure Ready-Mixed Paint. Forman-Ford & Co., Minneapolis, Minn.

Capacity of can	1.02 quarts
Lbs. per gallon	19.4

	Per cent
Pigment	62.89
Vehicle	37.11
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	90.00
Volatile dryer	7.70
Water	2.30
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	32.55*
Lead carbonate	20.12
Lead sulfate	1.82
Zinc oxide	45.42
Undetermined	.09
Total	100.00

Lab. No. 423. Outside White, Pure Carbonate of Lead Paint. The A. Wilhelm Co., Reading, Pa. The can showed a slight leak, therefore, its measurement could not well be determined.

	Per cent
Vehicle	37.98
Pigment	62.02
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	92.00
**Turpentine dryer	8.00
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	90.64
Lead sulfate	1.76
Zinc oxide	6.47
Undetermined	1.13
Total	100.00

The ratio of the hydroxide to the carbonate would not indicate the established proportions for normal white lead.

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* Several analyses were made of this product, which indicated that the ratio of carbon dioxide to white lead differed somewhat from the recognized standard. The amount of white lead is calculated on the hasis of lead hydroxide, Pb (OH)2.

** This product gave reaction for rosin oil.

Lab. No. 473. Commercial Ready-Mixed Paint. A. A. White & Co., Boston, Mass.

Color — White

Capacity of can	1.11 quarts
Contents of can	.96 quarts
Net weight	3 lbs. 3 ozs.

	Per cent
Vehicle	75.99
Pigment	24.01
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	77.61
Turpentine dryer	19.90
Water	2.49
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	.71
Zinc oxide	47.73
Calcium carbonate	45.50
Barytes	2.49
Silica and clay	2.86
Undetermined	.71
Total	100.00

Lab. No. 474. Derby Mixed Paint, Outside White. Ground in Perfectly Pure Linseed Oil. Jas. H. Prince Paint Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.00 quarts
Net weight	3 lbs. 6.8 ozs.

	Per cent
Vehicle	39.75
Pigment	60.25
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	62.59
Benzine	12.25
Water	25.16
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	17.61
Lead sulfate (sublimed lead)	14.91
Lead oxide	1.46
Zinc oxide	33.74
Barytes	29.33
Calcium Sulfate	2.87
Undetermined	.08
Total	100.00

Lab. No. 475. Shawmut Mixed Paint, Outside White. Warranted strictly Pure Linseed Oil paint. John Briggs & Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	.97 quarts
Net weight	3 lbs. 10 ozs.

	Per cent
Vehicle	42.22
Pigment	57.78
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	83.38
Benzine, Dryer	9.28
Water	7.34
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	12.79
Lead sulfate (sublimed lead)	4.13
Lead oxide	1.27
Zinc oxide	51.64
Barytes	29.09
Calcium carbonate	.45
Undetermined	.63
Total	100.00

Lab. No. 476. Moore's House Colors, White. Benjamin Moore & Co., Chicago, Ill.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.02 quarts
Net weight	3 lbs. 8.5 ozs.

	Per cent
Vehicle	38.64
Pigment	61.36
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	84.34
Turpentine dryer	6.60
Water	9.06
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate (sublimed lead)	33.20
Lead oxide	2.99
Zinc oxide	32.11
Calcium carbonate	7.18
Calcium sulfate	22.41
Undetermined	2.11
Total	100.00

Manufacturers assert that no calcium carbonate is used, the product being entirely calcium sulfate and gypsum. Our analysis, however, does not bear out the fact that the product is pure gypsum. They also deny the presence of water, but our analysis shows the presence of water in the sample as examined.

Lab. No. 477. *Tinted Gloss Paint, White. John Lucas & Co., New York, Philadelphia and Chicago.

Color — White

Capacity of can	1.05 quarts
Contents of can	.96 quarts
Net weight	3 lbs. 8.2 ozs.

	Per cent
Vehicle	40.36
Pigment	59.64
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	87.58
Turpentine dryer	9.95
Water	2.47
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	24.03
Lead sulfate	10.86
Lead oxide	.48
Zinc oxide	42.21
Asbestine:	
Silica. SiO_2	15.56
Magnesium oxide	6.41
Undetermined	.45
Total	100.00

Lab. No. 478. Ingersoll's Liquid Rubber Paint, Outside White Gloss. Office and Factories, 239-245 Plymouth St., Brooklyn, N. Y. The label further states:

"The only paint not affected by salt-air, moisture, coal-gas, or sun, so destructive to all other paints. They are,

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* The manufacturers claim this product is one produced under their old formulæ previous to May, 1908, at which time they revised their paint formulæ.

therefore, the best and most economical for house, ship, railway, steamboat, and all structural painting, where first-class, durable work is desired."

Color — White

Capacity of can	.96 quarts
Contents of can	.90 quarts
Net weight	2 lbs. 7.9 ozs.

	Per cent
Vehicle	62.65
Pigment	37.35
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	57.29
Turpentine dryer	5.84
Water	36.87
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	12.42
Zinc oxide	87.12
Undetermined	.46
Total	100.00

As soon as the analyses were completed, a report was made to the manufacturer in order that he might know what the findings were for this sample, but, owing to a transposition of the per cent of vehicle and pigment, an error occurred in reporting the ingredients of the vehicle. As soon as the error was discovered, a re-calculation was made and the analysis reported in the correct form and as determined by a further examination. The manufacturers objected on the ground that they did not produce a paint of this kind and stated, in order that we might have a sample of their special outside gloss white, they would submit a sample. They also objected to the publication of the analyses as not representing in any way the paint produced and sold by their house, although they stated that other cheaper grades were produced for customers.

The sample as submitted, labeled, "Ingersolls' Liquid Rubber Paints, socalled to indicate their superior elastic and binding qualities, which make them most impervious to the action of salt-water, coal-gas, moisture, or the sun's rays, so destructive to all other paints. They are, therefore, the best and most economical for house, ship railway, steamboat, and all structural painting, where thoroughly first-class, durable work is desired. Houses painted ten and fifteen years ago and still looking well, prove beyond question the durability of this paint which is sold entirely on its merit. For sale only at our factory to customers (direct for personal use). Delivered f. o. b. New York. Caution: Be sure our name is on every package and so avoid imposition."

There was also printed on the can, "Outside Gloss, "A," White Special. This label being different from the one on the sample previously examined, made it seem desirable that we should secure another sample like the first, Lab. No. 478, and inasmuch as the manufacturer claimed that we had been imposed upon by the first sample, the Department authorized an agent to go direct to the factory at 239 Plymouth St., Brookly, N. Y., and purchase a quantity of paint from the factory, taking receipt for the same. This was done and the receipt is signed by O. W. Ingersoll. The paint was labeled in identically the same manner as the first sample received, and was by us given the Lab. No. 508. We, therefore, give the analyses of the two samples. Lab. No. 511 submitted by the manufacturer and Lab. No. 508 as purchased by an agent of the Department direct from the factory.

	No. 508	511
Color	White	White
Capacity of can	.96 quarts	1.02 quarts
Contents of can	.93 quarts	1.02 quarts
Net weight	2 lbs. 9 ozs.	3 lbs. 9¾ ozs.
	Per cent	Per cent
Vehicle	58.77	45.70
Pigment	41.23	54.30
Total	100.00	100.00

ANALYSIS OF VEHICLE

	Per cent	Per cent
Linseed oil	58.11	95.36
Turpentine dryer	5.14	4.64
Water	36.75	trace
Total	100.00	100.00

ANALYSIS OF PIGMENT

	Per cent	Per cent
White lead	17.07	29.54
Lead sulfate	.36	.66
Zinc oxide	68.41	60.39
Silica	3.58	
Silicate of magnesia & alumina	9.61	
Silica and magnesia		8.89
Undetermined	.97	.52
Total	100.00	100.00

It will thus be observed that the composition of the paints are not at all uniform, and that No. 511 is not at all alike in composition with either of the others since it contains only a trace of water, a considerably larger proportion of white lead, and it is further noticeable that the paints are incorrectly labeled in that they do not contain rubber; at least none could be detected.

Lab. No. 479. Body white, Pure Linseed Oil. General Lead Co., St. Louis, Mo. The formula states, "Composed of

	Per cent
Barium sulfate	50
Lead carbonate	20
Zinc oxide	20
Linseed oil (bleached)	10
	100

The analysis showed:

	Per cent
Vehicle	8.5
Pigment	91.50
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Barytes	54.77
Zinc oxide	22.46
White lead	21.71
Lead sulfate	.19
Undetermined	.87
Total	100.00

Lab. No. 481. Roof, Barn and Bridge Paint, Red. Benjamin Hammond, Fishkill-on-Hudson, New York.

Color — Red

Capacity of can	1.05 quarts
Contents of can	1.02 quarts
Net weight	3 lbs.

	Per cent
Vehicle	48.8
Pigment	51.2
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	84.28
Turpentine dryer	14.90
Water	.82
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Iron, Fe_2O_3	14.50
Silica, SiO_2	17.82
Clay	4.00
Calcium carbonate	44.85
Calcium sulfate	18.62
Undetermined	.21
Total	100.00

Lab. No. 482. Cottage Colors, Hammond's No. 20. Hammond's Paint Works, Fishkill-on-Hudson, New York.

Color — Grey

Capacity of can	1.05 quarts
Contents of can	.98 quarts
Net weight	3 lbs. 5.8 ozs.

	Per cent
Vehicle	43.77
Pigment	56.23
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	92.36
Turpentine dryer	6.04
Water	1.60
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	43.67
Lead sulfate	5.25
Zinc oxide	29.98
Magnesium silicate	12.91
Barytes	1.94
Calcium carbonate	2.83
Calcium sulfate	.20
Iron and alumina	.84
Color and undetermined	2.38
Total	100.00

Lab. No. 486. Cottage Colors, Hammond's Pure White, Hammond's Paint Works, Fishkill-on-Hudson, New York.

Color — White

Capacity of can	1.05 quarts
Contents of can	.99 quarts
Net weight	3 lbs. 10 ozs.
	Per cent
Vehicle	37.94
Pigment	62.06
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	91.40
Turpentine dryer	5.97
Water	2.63
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	68.40
Zinc oxide	23.63
Silica	6.18
Magnesium silicate	1.75
Undetermined	.04
Total	100.00

Lab. No. 485. Paint, Outside White, Shawmut. John Briggs & Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	.98 quarts
Net weight	3 lbs. 10.6 ozs.

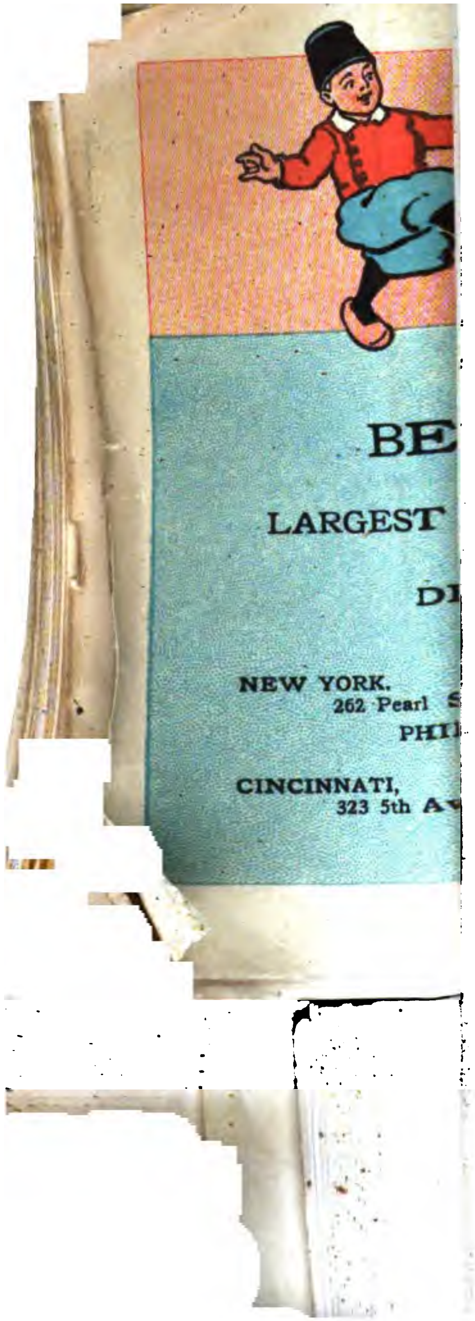
	Per cent
Vehicle	37.87
Pigment	62.13
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	84.46
Volatile oil	12.90
Water	2.64
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	15.60
Lead sulfate	.80
Zinc oxide	49.89
Barytes	32.68
Calcium sulfate	.81
Undetermined	.22
Total	100.00



Lab. No. 483. Chinese Gloss, White, Hammond's. Benjamin Hammond, Fishkill-on-Hudson, New York, N. Y.

Color — White

Capacity of can	1.05 quarts
Contents of can	.93 quarts
Net weight	3 lbs. 3 ozs.
	Per cent
Vehicle	44.37
Pigment	55.63
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	60.03
Benzine turpentine	37.77
Water	2.20
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	11.63
Zinc oxide	83.43
Silica	3.16
*Organic matter and undetermined	1.78
Total	100.00

Lab. No. 484. Outside White, Queen Anne. W. Snelling, East Boston, Mass. Mixed ready for use.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.05 quarts
Net weight	4 lbs. 2 ozs.
	Per cent
Vehicle	36.34
Pigment	63.66
Total	100.00

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* Nitrogenous like casein.

ANALYSIS OF VEHICLE	Per cent
Linseed oil	78.96
Turpentine dryer	3.17
Water	17.87
Total	100.00

ANALYSIS OF PIGMENT	Per cent
White lead	5.82
Lead sulfate	12.08
Zinc oxide	48.76
Barytes	18.37
Silica and magnesium silicate	14.25
Undetermined	.72
Total	100.00

Lab. No. 487. Tremont Prepared Paint, Outside White. Tremont Paint & Varnish Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	.98 quart
Net weight	4 lbs. 9 ozs.
	Per cent
Vehicle	34.78
Pigment	65.22
Total	100.00

ANALYSIS OF VEHICLE	Per cent
Linseed oil	89.80
Benzine dryer	7.90
Water	2.30
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	48.99
Lead sulfate	5.02
Zinc oxide	39.93
Magnesium silicate	4.53
Calcium sulfate	.81
Undetermined	.72
Total	100.00

Lab. No. 488. Highland Paint, Ready-Mixed. Manufactured for The Highland Color Co. No address given for either manufacturer or party for whom manufactured. Correspondence developed to show that this brand of paint was made by Wadsworth, Howland & Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.03 quarts
Net weight	3 lbs. 15.5 ozs.

	Per cent
Vehicle	33.83
Pigment	66.17
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	80.40
Benzine turpentine	16.94
Water	2.66
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate (sublimed lead)	17.85
Lead oxide	4.44
Zinc oxide	50.87
Silica	26.12
Undetermined	.72
Total	100.00

Lab. No. 490. Iveroid Liquid Colors, Color A 8 Grey. Iveroid Mixed Paint Co., Newark, N. J.

Color — Grey

Capacity of can	1.04 quarts
Contents of can	.92 quart
Net weight	2 lbs. 12.3 ozs.

	Per cent
Vehicle	49.21
Pigment	50.79
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	57.98
Benzine turpentine	21.70
Water	20.32
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	9.45
Lead sulfate	6.92
Zinc oxide	24.04
Barytes	13.87
Calcium carbonate	33.12
Calcium sulfate	1.40
Silica and Magnesium silicate	9.74
Color and undetermined	1.46
Total	100.00

A letter giving the analysis of this paint addressed to the Iveroid Mixed Paint Co., Newark, N. J., was returned with the notation, "No such party known."

Lab. No. 491. Highland Mixed Paint, No. 35. Highland Color Co. No address given.

Color — Grey

Capacity of can	1.05 quarts
Contents of can	1.05 quarts
Net weight	4 lbs. 2.9 ozs.

	Per cent
Vehicle	29.60
Pigment	70.40
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	86.19
Benzine turpentine	12.80
Water	1.01
Total	100.00

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ANALYSIS OF PIGMENT

	Per cent
White lead	20.75
Lead sulfate	1.77
Zinc oxide	38.03
Silica and Clay	33.06
Barytes	5.66
Undetermined	.73
Total	100.00

Lab. No. 492. Derby Mixed Paint, Outside White. Jas. H. Prince Paint Co., Boston, Mass.

Color — White
Capacity of can..................1.05 quarts
Contents of can.................. .90 quarts
Net weight....................3 lbs. 8 ozs.

	Per cent
Vehicle	35.18
Pigment	64.82
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	58.66
Benzine turpentine	10.93
Water	30.41
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	19.76
Lead sulfate	14.81
Zinc oxide	31.00
Barytes	34.20
Undetermined	.23
Total	100.00

Lab. No. 493. Tremont Prepared Paint, No. 15, Pearl Grey. Tremont Paint & Varnish Co., Boston, Mass.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.03 quarts
Net weight	3 lbs. 12.7 ozs.

	Per cent
Vehicle	38.13
Pigment	61.87
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	85.91
Turpentine dryer	9.90
Water	4.19
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	19.13
Lead sulfate	28.06
Zinc oxide	39.08
Magnesium silicate	2.86
Silica	7.27
Calcium carbonate	3.42
Undetermined	.18
Total	100.00

Lab. No. 494. Iveroid Liquid Colors, Outside White. Iveroid Mixed Paint Co., Milwaukee and Chicago. While this paint bears the same name and manufacturing concern as No. 490, it gives the address of the manufacturer as Milwaukee and Chicago instead of Newark, N. J.

Color — White

Capacity of can	1.04 quarts
Contents of can	.92 quarts
Net weight	2 lbs. 13.4 ozs.

	Per cent
Vehicle	45.93
Pigment	54.07
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	50.76
Turpentine dryer	25.30
Water	23.94
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	2.37
Zinc oxide	34.78
Barytes	13.70
Calcium carbonate	32.66
Calcium sulfate	3.87
Asbestine (Calcium & magnesium silicate)	11.74
Undetermined	.88
Total	100.00

Lab. No. 495. Queen Anne Paint, Pearl Grey, No. 164. J. W. Hoffman Co., Boston, Mass.

Color — Grey

Capacity of can	1.03 quarts
Contents of can	.94 quart
Net weight	3 lbs. 4.4 ozs.

	Per cent
Vehicle	38.42
Pigment	61.58
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	53.61
Benzine turpentine	24.00
Water	22.39
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	1.00
Lead sulfate	.16
Zinc oxide	40.70
Barytes	31.23
Calcium sulfate	11.98
Silica and magnesia	12.51
Iron and alumina	.98
Undetermined	1.44
Total	100.00

Lab. No. 496. Shawmut Mixed Paint, No. 114. John Briggs & Co., Boston, Mass.

Color — Grey

Capacity of can	1.05 quarts
Contents of can	1.00 quart
Net weight	3 lbs. 6.3 ozs.

	Per cent
Vehicle	40.67
Pigment	59.33
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	71.48
Turpentine dryer	15.00
Water	13.52
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	5.69
Lead sulfate	1.14
Zinc oxide	46.04
Barytes	27.82
Silica and Magnesia	13.96
Calcium carbonate	.12
Calcium sulfate	.92
Iron and alumina	2.50
Color and undetermined	1.81
Total	100.00

Lab. No. 499. Ready-Mixed Paint, Metropolitan Brand, Pea Green. Metropolitan Paint & Varnish Co., Philadelphia.

Color — Pea green

Capacity of can	1.05 quarts
Contents of can	.94 quart
Net weight	3 lbs. 2.7 ozs.

	Per cent
Vehicle	40.00
Pigment	60.00
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Linseed oil	78.85
Benzine turpentine	19.90
Water	1.25
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Barytes	27.78
China clay	9.46
Magnesium silicate	12.90
Silica	6.75
Lead sulfate (sublimed lead)	16.55
Lead oxide	2.10
Zinc oxide	22.28
Color and undetermined	2.18
Total	100.00

Lab. No. 501. Mixed Paint, Standard, Outside White. C. A. Wolsey Paint & Color Co., Jersey City, N. J.

Color — White

Capacity of can	1.00 quarts
Contents of can	.95 quarts
Net weight	3 lbs. 6.8 ozs.

	Per cent
Vehicle	36.57
Pigment	63.43
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	80.30
Benzine turpentine	11.50
Water	8.20
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Barytes	13.00
Silica	1.00
Lead sulfate (sublimed lead)	20.21
Lead oxide	1.58
Calcium carbonate	12.25
Calcium sulfate	8.68
Zinc oxide	42.73
Undetermined	.55
Total	100.00

Lab. No. 502. Ready-Mixed Paints, National. National White Lead & Color Co., Brooklyn, N. Y.

Color — White

Capacity of can	1.05 quarts
Contents of can	1.00 quarts
Net weight	3 lbs. 3 ozs.

	Per cent
Vehicle	42.96
Pigment	57.04
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	82.91
Benzine turpentine	14.00
Water	3.09
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Silica and magnesium silicate	14.72
Zinc oxide	52.38
Calcium carbonate	32.35
White lead	trace
Undetermined	.55
Total	100.00

Lab. No. 503. Ready-Mixed Paint, Metropolitan. Metropolitan Paint & Varnish Co., Philadelphia, Pa.

Color — Pea green

Capacity of can	1.05 quarts
Contents of can	.94 quarts
Net weight	3 lbs. 2.6 ozs.

	Per cent
Vehicle	40.81
Pigment	59.19
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	85.74
Benzine turpentine	12.60
Water	1.66
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Barytes	21.08
China clay	11.70
Silica	9.10
Magnesium silicate	17.90
Lead sulfate (sublimed lead)	13.67
Lead oxide	2.34
Zinc oxide	21.79
Color and undetermined	2.42
Total	100.00

Lab. No. 509. Lucas Gloss Paints, Outside White. John Lucas & Co., Philadelphia, Pa.

Color — White

Capacity of can	2.3 quarts
Contents of can	2.08 quarts
Net weight	7 lbs. 9 ozs.

	Per cent
Vehicle	40.79
Pigment	59.21
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	88.00
Turpentine dryer	12.00
Water	none
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
White lead	26.43
Lead sulfate	11.89
Zinc oxide	44.08
Asbestine (Silica and Magnesia)	16.50
Iron and alumina	.63
Undetermined	.47
Total	100.00

Lab. No. 512. Outside White, Tinted Gloss Paint, Pure Oil. John Lucas & Co., Chicago, Ill.

Color — White

Capacity of can	2.3 quarts
Contents of can	2.08 quarts
Net weight	7 lbs. 7 ozs.

	Per cent
Vehicle	41.12
Pigment	58.88
Total	100.00

ANALYSIS OF VEHICLE	Per cent
Linseed oil	88.85
Turpentine dryer	11.15
Water	trace
Total	100.00

ANALYSIS OF PIGMENT	Per cent
White lead	24.37
Lead sulfate (sublimed lead)	11.45
Lead oxide	3.15
Zinc oxide	43.71
Asbestine (silica and magnesia)	16.91
Undetermined	.41
Total	100.00

Lab. No. 513. Tinted Gloss Paint, No. 212. Lead Color Pure Oil. John Lucas & Co., Chicago, Ill.

Color — Grey

Capacity of can	2.3 quarts
Contents of can	2.08 quarts
Net weight	6 lbs. 13 ozs.

	Per cent
Vehicle	45.41
Pigment	54.59
Total	100.00

ANALYSIS OF VEHICLE	Per cent
Linseed oil	89.25
Turpentine dryer	10.75
Water	trace
Total	100.00

ANALYSIS OF PIGMENT	Per cent
White lead	15.53
Lead sulfate	16.13
Zinc oxide	42.26
Magnesium silicate	18.09
Silica	4.54
Iron and alumina	.78
Color and Undetermined	2.67
Total	100.00

Lab. No. 519. Mixed Paint, M. B. C. Brand. Eagle Paint & Varnish Co., Pittsburg, Pa. M. B. Cochran, President.

No. 39 Color. ¼ gallon.
Color — Grey

Capacity of can	1.02 quarts
Contents of can	1.00 quart
Net weight	3 lbs. 12 ozs.

	Per cent
Vehicle	39.20
Pigment	60.80
Total	100.00

ANALYSIS OF VEHICLE

	Per cent
Linseed oil	92.80
Turpentine dryer	7.20
Total	100.00

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate (sublimed lead)	32.68
Lead oxide	8.04
Zinc oxide	41.15
Calcium carbonate	5.03
Silica and silicates	12.58
Color and undetermined	.52
Total	100.00

ANALYSES OF WHITE LEADS

Several samples of white leads, or of products which were labeled and sold as white lead, have also been examined, and it is interesting to note that not one of those given in the following list is entitled to be considered as a white lead. They are sold under deceptive and misleading labels, and in a way that the purchaser would suppose that he was receiving pure white lead, meaning basic lead carbonate, when in reality he was purchasing a compound mixture for which he pays a good price. These products were all purchased in the original containers, and were opened and analyzed in the Laboratory of this Department.

Lab. No. 516. Royal White Lead. E. P. & V. Co., M. B. Cochran, President, Pittsburgh, Pa.

Net weight....................24 lbs. 5 ozs.

ANALYSIS OF PIGMENT

	Per cent
White lead	43.32
Lead sulfate	.54
Zinc oxide	11.60
Barium sulfate	42.28
Silica and silicate	1.67
Undetermined	.59
Total	100.00

The term "Royal White Lead" should indicate a good product; that is, some special brand of pure white lead; but the analysis does not bear out this conclusion, for less than half of the product is white lead, and it is largely adulterated with barytes.

Lab. No. 517. Anti-Trust Pure White Lead. Linseed oil. Benjamin Moore & Co., New York and Chicago. This label appeared upon the face of the can, and was also printed on the top or cover of the can itself.

Net weight....................24 lbs. 7 ozs.

ANALYSIS OF PIGMENT

	Per cent
White lead	13.08
Lead sulfate	.38
Zinc oxide	35.62
Zinc sulfide	1.10
Barium sulfate	40.96
Silica and silicates	7.72
Undetermined	1.14
Total	100.00

What would one infer when he reads the term "Pure White Lead"? Would he expect to purchase barytes, silica and other ingredients as part of the pure white lead; and, when as a part of the name they use the term "Anti-Trust," one would infer that it is a combination producing a pure lead in opposition to some lead trust. Unfortunately the analysis does not bear out this conclusion, but shows the kind of deception that is being practiced in the labeling and selling of this product.

Lab. No. 518. White Lead. Blue Seal Brand. Wm. Waterall & Co., Philadelphia, and Camden, N. J.

Net weight....................24 lbs. 5 ozs.

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate	28.93
Lead oxide	1.57
Zinc oxide	14.07
Barium sulfate	47.40
Silica and silicates	1.74
Calcium carbonate	2.27
Calcium sulfate	3.60
Undetermined	.42
Total	100.00

Like the preceding products this sample proves to be not a white lead and not even a mixture of white lead, in the true sense of the word, but is composed of lead sulfate; and among the adulterants are 47.40% of barytes and about 8% of other adulterants, like silica, lime, etc.

Lab. No. 520. White Lead, Buck Brand. Samuel H. French Co., Pittsburgh, Pa.

ANALYSIS OF PIGMENT

	Per cent
White lead	58.98
Zinc oxide	15.55
Barium sulfate	24.22
Silica and silicates	.80
Undetermined	.45
Total	100.00

This product is little more than one-half white lead to which has been added about 25% of barytes.

Lab. No. 521. Missouri White Lead, Refined Linseed Oil. Wm. Waterall Co., Philadelphia. The label on the can bore the following inscription: "This brand of Improved Lead has been on the market since 1879. It wears better, spreads over more surface; is free from acid; and, containing more oil, does not cake or harden in the package; and mixes more readily than old style corroded lead."

ANALYSIS OF PIGMENT

	Per cent
Lead sulfate	27.22
Lead oxide	.59
Zinc oxide	21.11
Calcium sulfate (hydrated)	10.99
Barytes	37.54
Silica and silicates	1.62
Undetermined	.93
Total	100.00

From the label one would infer that this was a special brand of pure white lead superior to the old style corroded lead, when, as a matter of fact, it does not contain true white lead at all, and contains about 50% of lime and barytes. We should call this, like the preceding white leads, "deceptive fakes," and no matter what their virtues may be as paints, they are indexes of low business morality and indicate the true reasons why the East does not want paint laws. In the face of conditions like these the argument that paint laws force manufacturers to reveal formulæ that have taken years to develop is all "bosh." In the future, gentlemen, tell the truth and help to develop, not drag down, the paint industry of the country.

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NORTH DAKOTA
Agricultural Experiment Station
Agricultural College, N. D.

PAINT BULLETIN

FOOD DEPARTMENT

Vol. I. MARCH, 1915 No. 6

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Commissioner.
Compiled and edited by
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Telegraph, express and freight office, Fargo, North Dakota.
Bulletins sent free to any citizen of the state interested in the work of this Department.

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I. LESSONS FROM THE 1906 TEST FENCE

By E. F. Ladd and W. F. Washburn

During the legal proceedings undertaken to determine the constitutionality of the paint law enacted by the Legislative Assembly of North Dakota in 1905, it became evident that there was a lack of data relative to the wearing qualities of the various pigments and their combinations. Therefore, in order to obtain more information on this subject, there was erected in 1906 on the College grounds a fence for the practical testing of paints, now designated as the "1906 Test Fence."

The materials used in this work have been fully described in the Report of the Food Commissioner of North Dakota (1907), which reads as follows:

"The paints used in this test comprised various paste leads, a number of the leading brands of mixed paints sold in North Dakota, (usually the white and gray of each brand being selected) mail-order-house paints and some special tints—yellow, green, blue and red. As far as possible the directions on the cans or accompanying literature were followed." Each paint was applied on four different surfaces, i. e., soft pine, hard pine, cedar siding and soft pine siding.

These experiments were undertaken with a view to determining the paints best suited as protective coatings under the climatic conditions prevailing in this section. However, it soon became evident that there are so many factors affecting the durability of a paint that it is practically impossible to draw definite conclusions from a test so broad in its scope. Therefore, we will not discuss formulas at this time but rather confine our conclusions to a few general results that have been thoroughly established by this experiment and for the most part duplicated on other fences or house tests.

Ochre Priming: Ochre was used as a priming coat on several of the formulas and was found very unsatisfactory in each case. It caused early failure of the paint film and did not appear to establish a good bond between the wood and the body coat.

(See figure No. 1 showing effect of ochre priming coat.)

Varieties of Wood: The paints applied on the white pine are in somewhat better condition than on cedar; while the same paints applied to hard pine are, without exception, in much poorer condition than on the other woods. Possibly, if proper variations had been made in the reduction of the priming coats the results of the test would have been more comparable. It appears to be the consensus of opinion among the paint experts that the priming coat for hard pine and other resinous, non-absorbent woods should contain a large percentage of volatile thinners, i. e., turpentine or benzine, and some advocate the addition of a small quantity of benzol.

(See figure No. 2 for influence of wood.)

White Vs. Colored Paints: The colored paints used in this test show decidedly better wearing qualities than the same formulas untinted. This modifying effect appears to depend not only upon the color of the paint but also upon the nature of the materials used to produce the color.

Mail-Order-House Paints: Two of the better known "mail-order-house" paints that were representative of a class that had a large sale in the Northwest, were included in these tests. Both of these paints failed completely, as they were badly disintegrated before two years had elapsed. These results show clearly that it is false economy to purchase paint not manufactured or guaranteed by a reputable concern. A high grade paint will always bear the name of the manufacturer and usually the analysis on the label or container. It is interesting to note in this connection that the house furnishing one of the above paints has failed and the other is now supplying a high grade article. This series of tests together with the publicity given paints of this description through the publications of this Department, was probably instrumental in bringing about this change.

Single Pigment Vs. Combination Paints: It is maintained by the majority of the paint experts that a combination paint is far more satisfactory for a protective coating than a single pigment paint inasmuch as it has better color, does not check or chalk, and is not affected by the atmospheric gases. This may be true of a properly compounded paint, but none of the mixed paints, under the conditions of this experiment, showed any superiority over the two single pigments included in this test. As a matter of fact, the panels coated with basic carbonate of lead and with basic sulphate of lead show marked superiority over the other panels in the following respects, i. e., color and condition for repainting. It is true that the white leads have checked very badly and show considerable chalking, (the basic sulphate excessively) but from the decorative standpoint they are very satisfactory and their surfaces are in good condition for repainting. The mixed paints, on the other hand, present a rather dingy appearance and have disintegrated leaving a hard, flinty surface that is cracking badly and in many cases indicates a decided tendency to flake or scale; thus, leaving a treacherous surface for repainting.

It has been stated by one of the well known paint authorities that 80 per cent of the paint used is applied over old surfaces; thus, it is patent that one of the most essential requirements of a paint is that it will leave a good surface for repainting. In justice to the paint manufacturers it may be well to add that the formulae of a number of the brands of paints used on this fence have already been modified to meet this very important requirement.

In conclusion, the results of the experiments on this fence have been: The public has been educated to demand higher grade paints; the defects of the paint formulae have been demonstrated; and, finally, the necessity of more scientific investigation along the lines of paint manufacture has been indicated.

We have secured the financial support and hearty co-operation of the paint manufacturers in carrying out a systematic series of tests on the various pigments, oils, volatile thinners and their combinations with a view to correcting the existing defects in the paint formulae, and hope, after the experiments now in progress are concluded, to be able to offer more definite information along these lines.

Many other features have been indicated in connection with the experimental tests on the 1906 fence, or, as indicated by the tests on this fence, have been emphasized by further trials in other tests. Among these may be mentioned the following:

Catalog-House Paints: The usual catalog-house paint, at that time as found upon the market, was a cheap, inferior product, affording little real protection and without proper wearing quality.

Many of the products sold as white lead were in reality compounds, at times containing no white lead at all.

Not a few of the paints, when this experiment was begun, were found to contain much added water in the vehicle, displacing the oil, and proving injurious to the wearing quality of the paint. Publicity in connection with this test has caused a marked change and water is not now generally used. These trials indicate that the substitution of water for a part of the vehicle is always against the best interests of the user of paints. The moisture natural to the ingredients of the paint are not to be looked upon as adulteration or substitution.

(See figure number 3 for influence of moisture in paints on wearing quality.)

General Deductions: In mixed paints the addition of color improved considerably the wearing quality of the paints; and the darker colors showed better wearing quality than the light colors.

Again, it was shown that the character of the lumber influenced to a large extent the lasting quality of the paints as paints were ordinarily applied; soft pine proving to be far better than hard pine or even than Western cedar or fir.

Ochre of the quality found on the markets at that time proved a most inferior priming coat, and our general experience leads us to discredit the use of commercial ochre as a priming coat for North Dakota conditions and lumber. As the result of these experiments the use of ochre as a priming coat has been largely discontinued.

The indications are that it is far safer to use as a priming coat the same paint as is to be applied in the finishing coat, properly thinned with oil and turpentine, rather than to use ochre; and white lead (basic or sublimed) well thinned with pure linseed oil and turpentine has shown good quality and is well adapted as a priming coat.

Test Fences as House Tests: From these experiments it appears that trials made upon a test fence, as used in North Dakota, may be considered as in a measure an accelerated house test,—the experience being that the wearing ratio is about 3 to 5; or, that test fences will by the end of three years show about the same condition for average paints as where the tests are made on houses and at the end of five years.

That test fences properly constructed and with paint applied in accordance with the usual methods of practice, constitutes the most practical and satisfactory method which we have been able to devise for studying and testing the wearing qualities of paints; and that it is also desirable to employ enough checks upon residences, both old and new, to verify the test fence findings.

Benzine as Turpentine: That the substitution of benzine for turpentine does not appear to give the same result as where turpentine as the thinner is employed in moderate quantities. But here there is needed much work to determine the changes that actually take place in paint films, both the pigment and vehicle portions, during the period of drying and hardening.

4. (See figure number 4 as showing effect of benzine—compare with No. 7 when turpentine was used.)

That in these experiments the tests have not indicated any advantage either in hiding or the wearing quality for the three or four-pigment paint over a single or two-pigment paint when properly proportioned.

Poor Paints Dangerous: In repainting the indications have been that a bad foundation from a previous painting, where inferior paints were used, cannot be expected to give a lasting film of good protective quality. That a paint having a composition as follows:

VEHICLE

	Per cent
Linseed oil	57.2
Benzine drier	26.7
Water	16.1
	100.0

PIGMENT

	per cent
Zinc oxide	31.3
Calc. carbonate	45.4
Barytes	22.8
Clay, silica, etc	0.5
	100.0

5. (See figure number 5 showing effect of bad paints.)

did not prove satisfactory either as a protective coating against climatic conditions nor did it wear for any appreciable length of time. Disintegration soon began and in less than one year peeling and checking had proceeded rapidly,—the paint being off in large patches and in bad shape on all the surfaces, and this on three types of lumber.

Here is an example of one of the well-known catalog-house paints common at the time when this experiment was undertaken.

On the other hand, another panel which was painted in 1906 with red oxide of iron, was still in good condition in 1914, with no repainting for the entire period. It would seem probable, therefore, that it is possible to have a paint film of such lasting and protective qualities as will afford good protection for a number of years even without repainting.

Repainting Defects: These experiments indicate that repainting often brings out defects in the first painting not previously recognized, and a paint accredited to wear well on first painting may be found to show its serious defects after repainting. The causes for this may be better determined by further experiments, but it has been indicated that several reasons may be found why the film has not afforded a proper medium for receiving the new paint.

In these tests sublimed lead has not been found inferior in wearing quality to the basic white lead. The indications are that white lead chalks earlier than sublimed lead, and that sublimed lead chalks more and continues longer than basic white lead.

Further statements and conclusions are withheld until other experiments now in progress have been completed.

(See figure number 6 as showing good surface for repainting.)

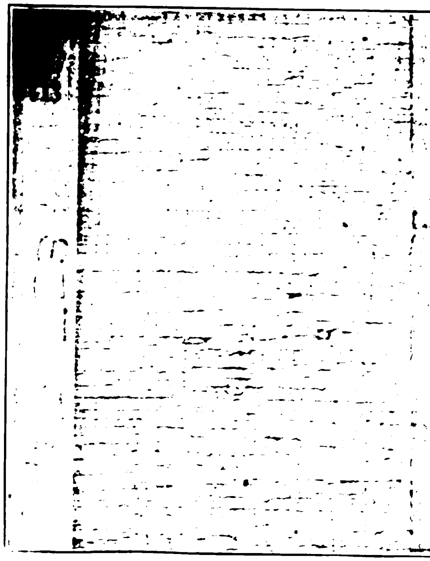


Fig. 4-A. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 10% Benzine.

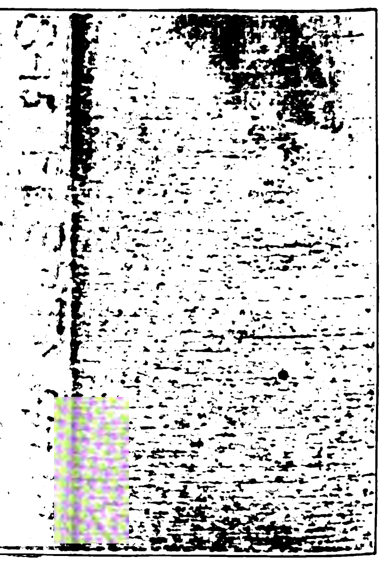


Fig. 4-B. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 25% Benzine.

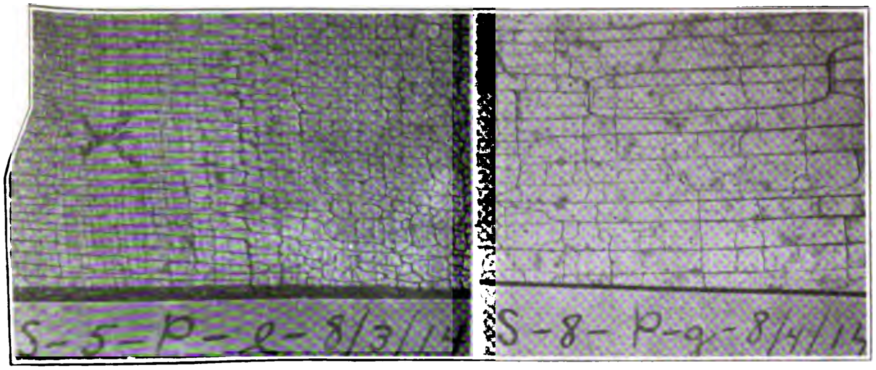


Fig. 5-A and 5-B show bad condition of paint for repainting, the result of using inferior paints—A dangerous surface for repainting.

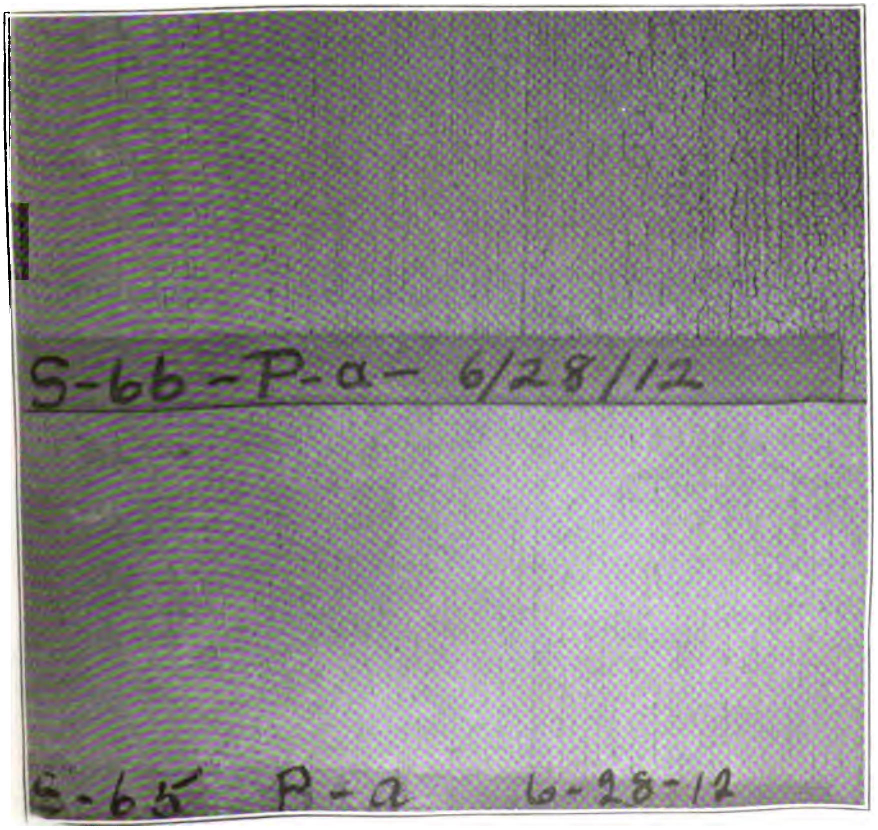
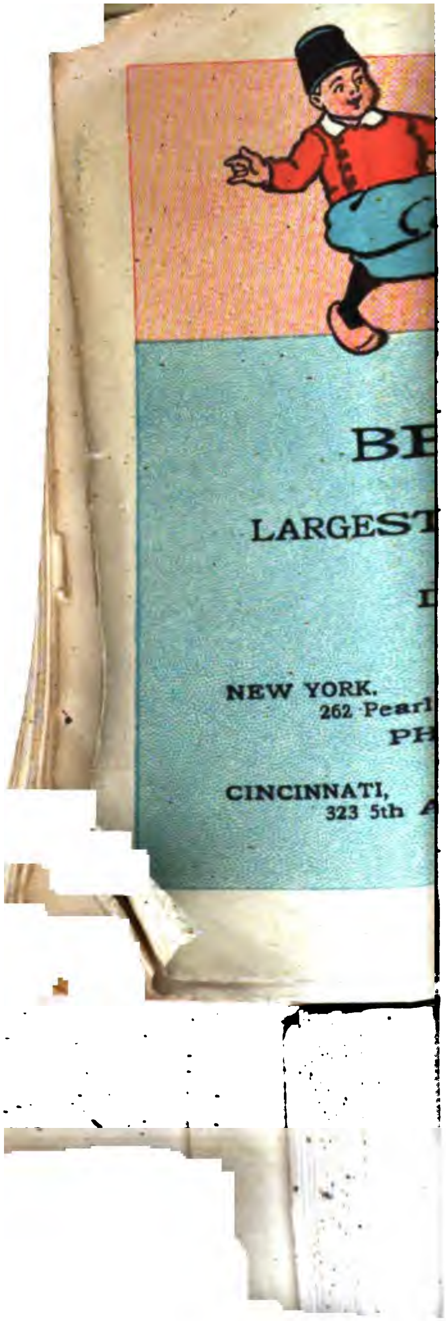


Fig. 1. S-65. Shows three coats white lead paint.
S-66. Shows two coats white lead over on ochre priming coat.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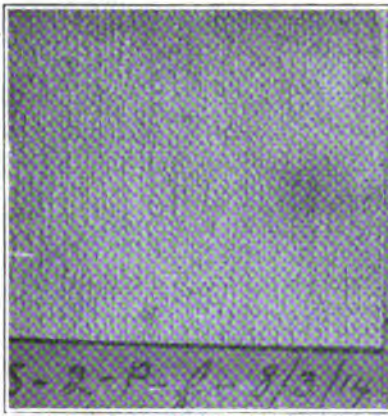
Fig. 6-A. Sublimed White Lead at time for repainting. A good surface.

Fig. 6-B. White Lead at time for repainting. A good surface.

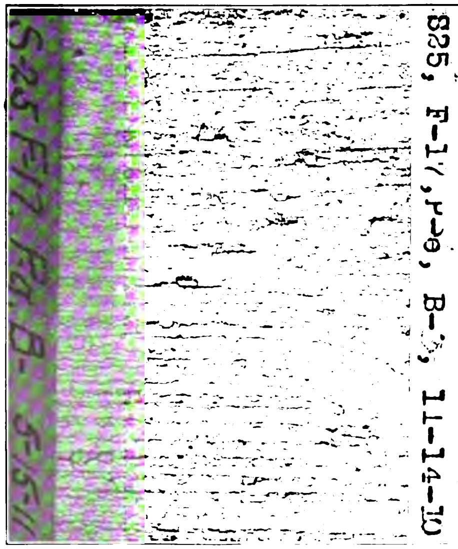
Fig. 2-A. Corroded White Lead, Hard Pine.

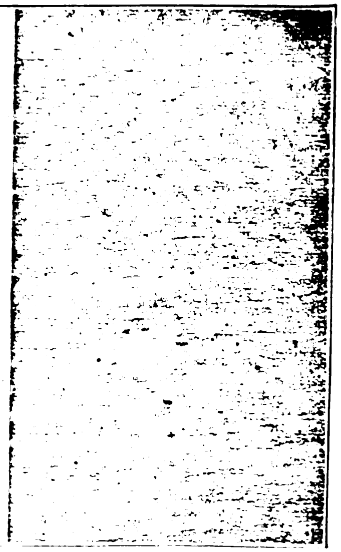
Fig. 2-B. Corroded White Lead. Soft Pine.

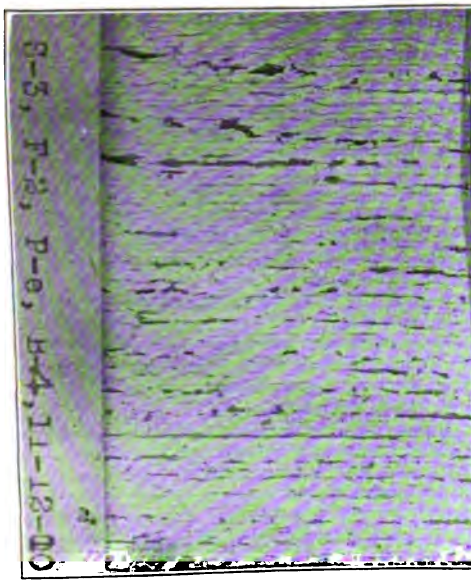

Fig. 3-A. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 4% water; 3 years' exposure.

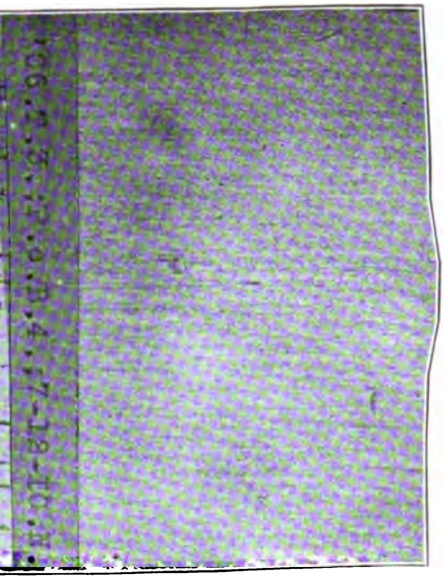

Fig. 3-B. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains no water; 4 years exposure.

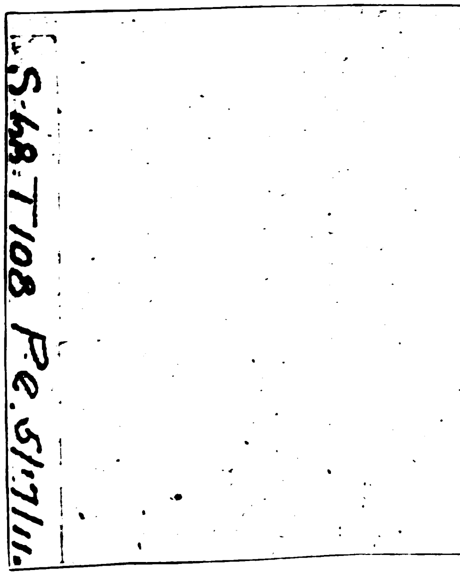

Fig. 7-A. Corroded White Lead, Zinc Oxide; Normal Turpentine Content.

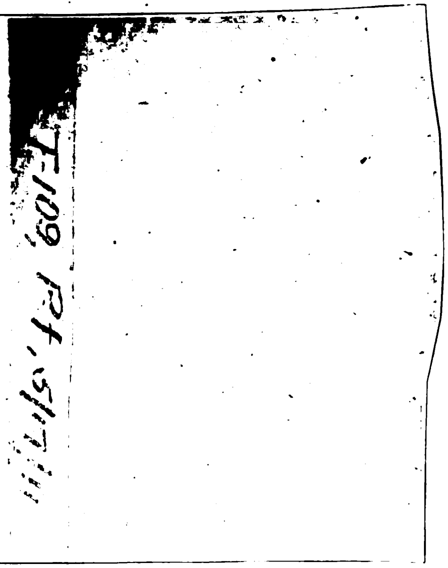

Fig. 7-B. Same as Fig. 7-A. High content Turpentine.

High per cent of turpentine has not been beneficial. Compare with Figs. 4-A and B, with benzine substituteed for turpentine.

II. NORTH DAKOTA PAINT LAW AND ITS BENEFITS

BY E. F. LADD

Previous to 1905 the condition in paint matters in North Dakota was, to say the least, chaotic. The people had become discouraged, some feeling that none of the paints were trustworthy, others uncertain whether it was due to the poor quality of the paint or to climatic conditions that such bad results were common and the condition of the painted buildings generally so bad.

With the enactment of the first effective Paint Law, North Dakota, in 1905, took a stand to determine whether the conditions, as already indicated, were due to the character of the paints by forcing the manufacturers to give to the public information as to the composition of the paint products which they proposed to sell within the limits of this state.

At that time, not all paints were bad; not all paints were adulterated; but such a large per cent were inferior, adulterated or misbranded that their use on buildings often made the conditions for repainting unsatisfactory even for good paints, since even the best of paints placed over a bad surface, due to bad paint, cannot last or give good protection and the high grade paint may be wrongly condemned for the faults of the inferior paint first used. At the time mentioned there were sold in North Dakota 23 paints that contained from 9.1% to 24% water. Certainly, the water was added for no other purpose than to cheapen the cost of the paint and was an adulterant positively injurious to the qualities of any paint. Here we have excluded those paints that contain less than 2% of water, which may be classed as incidental to the process of manufacture.

There were formerly one dozen brands of white lead sold in this state, in reality compounds which contained from no white lead at all to not more than 50% of white lead. These compounds were sold in direct competition with pure white lead which pure products were being forced from the market by compounds costing less than one-half the price for good white lead and yet generally retailed for nearly the full price of pure white leads. Who was benefited by the sale of these fraudulent white leads? It is no justification to assert they wear well for the fraud is apparent in the cost of manufacture as compared with the selling price. Many paints were sold by catalog-houses or paint manufacturers direct to the consumer through advertisements and in the majority of cases these paints were notorious frauds. More than that, these same paints were often short in weight or measure; for example, one product sold as one gallon was found to average 3.41 quarts; others were from 5% to 15% short in actual measure.

Paints containing water also usually contained benzine in place of turpentine, and this constituted a much larger per cent of the vehicle than would be permissible under any ordinary conditions, or than any good painter would permit, even though petroleum products were to be used in place of turpentine.

Our examination showed that many of the paints contained large proportions of so-called inerts, in some instances, worthless paint material as a portion of the pigment. None of the manufacturers were publicly claiming that mixed paints should contain more than 15% of such inerts. Our examination showed that 34 paints, then sold in North Dakota, contained more than this amount, varying from 16.4% to 70.6% of the total pigment.

The ochre generally sold at that time and used as priming-coats was of inferior quality and unfit for use over which to place a good paint.

None of the paints were labeled to show of what they were composed, nor did the manufacturers make any attempt to inform the public of the true composition of their products. In fact, many of the labels bore misleading and false statements leading the purchaser to believe that the mixed paint was composed of pure white lead, pure zinc oxide, pure linseed oil, pure turpentine as the chief constituents, when perhaps there was not present more than a negligable quantity of these products.

Since the enactment of the Paint Law in 1905 all these conditions have largely changed. No longer is there a paint sold within the state that contains added water. No longer is there sold within the state a product labeled as White Lead which is not true to name. No longer are the paints sold in the state short-weight or short-measure. No longer are paints permitted to be sold which are not labeled to show the composition of the same. More than that, the educational work that has been carried on has enlightened the people of the state as to what consitutes quality in paint, has led to improvement in paint manufacture, and in the use of paints; and, today, instead of buildings in bad condition due to inferior paint, we find buildings generally well painted. Manufacturers have been led to make a more thorough study of the question of paints; in fact, it is generally conceded that the first scientific investigation of paints dates from the enactment of the North Dakota Paint Law and the experiments which were inaugurated in North Dakota. I would not have it understood that all of the evils of the paint industry have been eradicated, or that every paint manufacturer is producing the best paint he knows how to produce; but the conditions are so much improved during this period that the results are noticeable to those who are investigating the present day paint problems. There are those manufacturers who have opposed paint legislation and one of their arguments has been that conditions have changed; that no longer the conditions which formerly existed in North Dakota are to be found either here or in other parts of the country; no longer are paints sold which are misrepresented. True, manufacturers have discouraged making false claims on the label with regard to the composition of their paints, but, they still indirectly too often lead the public to believe that the paint is entirely different in composition from that actually found within the container. They have claimed that the enactment of the North Dakota Paint Law has not been a chief factor in bringing about improved conditions, but rather that throughout the whole country there has been a marked uplift and general improvement in the quality of the paint manufactured and sold. Will a study of the facts wholly bear out this contention? Are the same class of paints generally sold in other parts of the country as are sold in North Dakota? Has the improvement in the quality of the paint for the middle and eastern states been the same as for this state? That we might determine to what extent it was necessary to rely upon the enforcement of our Law for the protection of the people of our state, a careful examination has been made of the paints sold throughout the country. Paints generally sold in North Dakota have been analyzed as well as those sold in other parts of the country and the results are set forth in this bulletin. The public should be in position to know to what extent the statements made by those interested in preventing the enactment of laws may be true with regard to the necessity for paint legislation. The writer maintains, as he has throughout the past, that the purchasing public have a right to know what is contained in the paint which they are asked to purchase, that they may then select for themselves the character of the product they desire to use. Until we have adequate paint legislation, as shown by past experience, it is clearly evident we may expect to have frauds and deception practiced in the sale of paints, and this fact is well illustrated by the data presented in the pages of this bulletin. North Dakota has been immensely benefited by the enactment of the Paint Law and its enforcement during the past ten years and has enjoyed a protection against fraud which has not been afforded to other parts of the country. The North Dakota Paint Law may not be perfect but it has served a useful purpose in affording protection to householders of the state. To guarantee a paint as "Composed of only pure paint material" or as "100 per cent pure paint" may be even more deceptive than the old forms of advertising, for such claims may be and are being applied to a paint containing, for example, neither white lead nor zinc oxide and be intended to give the common impression to the lay public of pure white lead and zinc oxide as the chief pigments. Many other subterfuges are likewise being employed not more defensible than the foregoing.

Improvement in Paints: Has the North Dakota Paint Law had any effect on the quality of paints sold within the state, or, are the paints generally sold in North Dakota in any respect better than those generally sold in other parts of the country? By better, I mean, do they contain a larger portion of white lead and zinc oxide or of turpentine and pure linseed oil and less of benzine and the so-called inerts?

For purposes of comparison I take a number of paints generally sold in North Dakota when our Law went in force. The analyses for the several laboratory numbers are shown in table No. 1.

TABLE 1

	49	56	185	167	183
Pigment	83.90%	59.80%	58.90%	67.10%	57.80%
Vehicle	16.10	40.20	41.10	32.90	42.20
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Linseed oil	....	52.00%	80.20%	83.90%	77.90%
Turpentine	....	26.00	00.00	00.00	00.00
Benzine	....		8.50	4.30	7.60
Water	....	22.00	11.30	11.80	14.50
Total	....	100.00%	100.00%	100.00%	100.00%
White lead	00.00%	23.25%	00.00%	00.00%	00.00%
Sublimed lead	00.00	00.00	00.00	00.00	00.00
Lead Sulfate	00.00	7.12	39.26	4.73	14.23
Zinc oxide	53.00	31.80	34.20	24.34	37.57
Calcium carbonate	45.90	28.44	5.39	4.47	41.70
Magnesium carbonate	1.01	00.00	00.00	00.00	00.00
Barytes	00.00	9.18	19.90	66.26	6.10
Silica and silicates	00.00	00.00	00.00	00.00	
Undetermined	0.09	0.23	1.23	0.23	0.40
Total	100.00%	100.00%	100.00%	100.00%	100.00%

In table I it is clearly evident that water was present in very many of the paints, from II per cent to 22 per cent; that benzine was not uncommon; while turpentine was less prominent. The white lead varied from none to 23 per cent. Lead sulphate was a constituent to a small extent in some. The so-called "innert" ranged from about 25 per cent to above 70 per cent.

Let us compare these results with the condition of some of the paints sold in North Dakota at the present time as illustrated in table II.

TABLE II.

	1023	1026	1031	1035	1040
Pigment	62.25%	64.40%	60.66%	56.08%	60.40%
Vehicle	37.75	35.60	39.34	43.92	39.60
Total	100 00%	100.00%	100.00%	100.00%	100.00%
Linseed oil	91.66%	89.86%	88.70%	90.57%	84.68%
Turpentine	3.76	7.46	6.60	7.10	13.67
Benzine	4.02	1.42	1.80	0.45	00.00
Water	0.56	1.26	2.90	1.88	1.65
Total	100.00%	100.00%	100.00%	100.00%	100.00%
White lead	40.12%	59.93%	57.12%	50.52%	43.64%
Zinc oxide	47.40	39.25	46.58	48.58	55.98
Calcium carbonate	2.00	....	....	......	....
Silica and silicates	10.23	....	....	......	....
Resinous matter	.....	....	0.52	.....	....
Undetermined	0.25	0.82	1.78	0.90	0.38
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Table II. shows that among the better paints sold in this state there is but a small per cent of either benzine or water present. White lead is a prominent constituent, while the "inerts" are wanting. I would not have it understood that there are no paints being sold in North Dakota with considerable quantities of inerts, but even those manufacturers selling paints containing inerts would have the public believe that not more than 15 per cent to 20 per cent is used and are constantly explaining as to the justification for the use of inerts. Certainly, there is a marked improvement over the paints as sold before the enactment of our Paint Law, and if we examine the character of the white leads, as previously indicated, we shall find a more marked difference in these.

Let us now turn our attention to some of the paints sold in other parts of the country. I have selected for table III. samples of paints sold in the east, south and west as showing to what extent they differ from the paints generally sold in this state.

TABLE III.

	958	964	1072	1075	954
Pigment	71.91%	71.15%	61.24%	64.52%	74.53%
Vehicle	28.09	28.83	38.76	35.48	25.47
Total	100.00%	100.00%	100.00%	100.00%	100.00%
Linseed oil	85.60%	90.40%	62.23%	94.06%	87.70%
Turpentine	00.00	00.00	00.00	00.00	00.00
Benzine	14.40	9.60	28.77	5.94	12.30
Water	00.00	00.00	9.00	00.00	00.00
Total	100.00%	100.00%	100.00%	100.00%	100.00%
White lead	00.00%	00.00%	00.00%	00.00%	8.67%
Sublimed lead	14.71	15.19	00.00	31.12	00.00
Lead sulphate	00.00	00.00	00.00	00.00	00.00
Zinc oxide	59.66	58.46	00.00	30.60	34.14
Calcium carbonate	5.16	4.71	37.00	3.37	6.55
Magnesium carbonate	3.12	00.00	3.83	00.00	6.67
Barytes	00.00	00.00	00.00	6.31	00.00
Silica and silicates	17.53	21.31	20.75	26.86	23.97
Oxides, Iron and alumina	00.00	00.00	00.00	1.74	00.00
Lithophone	00.00	00.00	37.69	00.00	00.00
Undetermined	00.00	0.33	0.73	00.00	00.00
Total	100.00%	100.00%	100.00%	100.00%	100.00%

In several instances the impression is gained that the paints reported in table III. contain good quantities of white lead and zinc oxide. No attempt is made to emphasize the extent to which the so-called "inerts" are employed. A Paint Law like that of North Dakota, would unmask the character of every one of these paints and give the public information as to the composition of the same. The writer is one who believes that the public would soon learn to understand what elements go to make up a good paint.

Those interested can find abundant evidence in previous bulletins, Nos. 67-70-86, paint bulletin No. 5 and the present bulletin to illustrate existing conditions.

It is true that at the present time much is written for the purpose of befogging the public, and many most ridiculous and absurd statements are made by men of recognized ability who are fostering this class of paint literature.

The addition of color to the pigment will tend to prolong the life of the paint and give the appearance of a better quality of paint than would be the case for an uncolored or white pigment; and so to overcome the short life of the paint we have the campaign inaugurated of frequent painting, or, as one man has well said with regard to his varnish: It's a repeater for if a man uses it once he will need to use it again at the end of six months or a year. And so the repetition goes on. Such methods are not, in my judgment, for the best ultimate interests of either the consuming public or of the manufacturer who is endeavoring to put out a high grade product.

In our analyses throughout we have generally used the term benzine for describing the petroleum product used. Some manufacturers object to this term but not justly, since there is a considerable variation in the products employed but all come well within the definition for benzine, also frequently referred to as petroleum spirits.

Cost of Paint Pigments: The relative cost of the various pigments used in manufacturing paints is of vast importance to the manufacturer, and the following table gives the prices for a number of the pigments as recently quoted in paint journals.

	Price per 100 lbs.
White lead	$5.00 to $5.25
Sublimed lead	4.75 to 5.00
Zinc oxide	5.38 to 7.00
Lithophone	3.75 to 4.50
Barytes	0.90 to 1.15
Whiting (calcium carbonate)	0.42 to 0.45
Paris white, cliffstone, (calc. carb.)	0.75 to 1.10
Magnesium silicate	0.70 to 1.25
Silex and silica	0.60 to 2.00
China white (clay)	0.40 to 0.45

If one makes a careful study of the above figures many interesting features are developed and it is easy to understand why one would prefer to use China clay or whiting at 40 cents to 45 cents per hundred pounds as compared with white lead or Zinc oxide at from $4.75 to $7.00 per hundred.

Barytes furnishes weight; whiting, china clay, or magnesium silicate gives bulk; and these two factors, weight and bulk, are important to the paint manufacturer. There is profit from the use of these so-called "inerts" as compared with white lead or zinc oxide. The reason then for the substitution of some of these inerts in the place of white lead might be cheapness rather than improvement in the quality of the paint. In the same way the addition of 15 to 30 per cent of benzine or other petroleum products in place of turpentine is apparently demonstrable as being based on cost more largely than on efficiency or the adding of anything of value to the wearing or protective quality of the paint.

Having considered the cost of paint pigments, we may now inquire as to the cost of the ingredients which go to make up one gallon of mixed paint.

A Gallon of Paint: If we consider a paint like No. 1026, analysis for which is given in this Bulletin, as compared with paint No. 1072, we shall have the two distinct types. The first paint, containing approximately 60 per cent of white lead and 40 per cent of zinc oxide, would cost for the white lead 32.8 cents, for the zinc oxide 23.6 cents, or a total cost of pigments, for one gallon of paint, amounting to 56.4 cents.

On the other hand, paint No. 1072, containing no white lead, would cost approximately 11 cents per gallon for the same material, or, less than ⅕ of the cost of the pigments for one gallon of the first paint.

If, in the first paint, linseed oil and turpentine were used as the vehicle, and in the latter paint, linseed oil and benzine, the difference in the cost would be even greater, since the linseed oil is worth approximately, per gallon, 55 cents, benzine 15 cents, and turpentine 45 cents. This would then make the cost of substituting benzine one-third of that where turpintine was used. Since benzine would also take the place of a portion of the linseed oil, there would be a further saving. Or, in other words, paint No. 1072 would cost, per gallon, for material, approximately one-fourth of that for the material used in paint No. 1026.

The two paints are not to be compared, in my judgment, with regard to protective or lasting qualities, but their selling price will not be very different to the purchaser. The hiding power of white lead is very great as compared with that of barytes or of gypsum, which have almost no hiding power, or of whiting, calcium carbonate, which is about the same as that of barytes. But the spreading power of these latter pigments is far greater, in fact, approximately twice that of white lead. As to the relative wearing qualities, we have discussed these elsewhere in this Bulletin.

White Leads as Compounds: How is it with white leads as compared with compound white leads? We are told that the compound white leads wear better than white lead itself, and yet the compound white leads are seldom retailed much, if any, below the price charged for a pure white lead.

Let us take the ingredients which go to make up the pigments for a product sold as white lead like paint No. 1087. 100 pounds of dry white lead would cost approximately $5.00. 100 pounds of compound pigment, which makes up the white lead of No. 1087, would cost approximately $1.70. May it not be, therefore, that the question of cost has something to do with the reason why there are continuously being put upon the market new brands of compounds under the name of white leads, or, attempts made to sell such compounds as white lead? Is the substitution of the mixed pigments in the compound, white lead and sold for white lead itself, done in the interests of the people who are users of paint, or, in the interests of the manufacturer who is looking for profits and trade advantages, not always, it would seem, with due regard to the rights of the purchaser? Then why do many paint manufacturers continue to oppose paint legislation? Is there not an apparent possible reason for their continued opposition to all forms of paint legislation calling for the exposures sure to follow with paint labeling? Telling the truth hurts no straight business.

III. ANALYSES OF MIXED PAINTS

By E. F. Ladd and W. F. Washburn

In previous Bulletins, especially Nos. 67, 70 and 86, Paint Bulletin No. 5, and special bulletins Nos. 11 and 20 in Vol. II., as well as in the Annual Reports of this Department, the analysis of a large number of paints are given. Some of these bulletins are now out of print, and during the past two years numerous analyses have been made of the various paints found upon the market; some used in experimental work, others for determining the character of the paint products now generally sold throughout the country in connection with the study of paints carried on in this state. In most cases I am giving the analyses without special comment, but I would call particular attention to those products containing large amounts of "inerts", water, and volatile products other than turpentine; also, to the numerous white leads labeled as pure white lead when, in reality, they are compounds. The analyses presented herewith have been made by, or under the immediate direction of W. F. Washburn and during the past year he has been assisted by Louis Engerud and Herbert Gross.

A good paint law would be a protection to every honest manufacturer who has to compete with those who are so labeling their products as to deceive the public, and such a law would force all manufacturers to put a label formula on the cans, giving the purchaser a fair chance to get what he wants.

A few of the large manufacturers still cling to the deceptive methods of producing a paint from cheap material, like lime, barytes, chalk, clay, etc., which costs from one-fifth to one-tenth of the well recognized paint materials. I am not pleading for a discontinuance of the use of all or any of these low priced pigments, but I am asking for truthful labeling. When we have truthful labeling we can leave it to the public to decide what they will buy and pay for, or what they prefer to use for any particular purpose. The price of materials and not quality seems often to govern, rather than an attempt to get the very best material for a good wearing paint. The result is disastrous.

We have shown how some of the catalog-house paints have stood the test, going to pieces in twelve to eighteen months and leaving a bad surface for repainting. Paint manufacturers said that a good thing was done in exposing the character of the products made and sold as paints by those firms, and as given in our bulletin No. 70. Some paints very similar in composition are shown in the following pages, and it is questionable whether the wearing quality of such paints will be any better when made by the large paint manufacturing establishment, than when the same was made and sold by a large catalog-house. At least, one catalog-house is now producing a paint that analyzes far better than that being put out by some of the paint houses, and already there may be seen the hand writing on the wall for those who seek to manipulate facts, for in the end right will prevail, and the people are now rapidly forming an opinion of their own.

It is regretable to see the results of experiments perverted to further a false sense of security for paints of questionable character, or to further mislead the users of paints. It matters not whether it is the paint manufacturer or the painter who fails to do his duty by the public, for in the end each will be without a good standing in the community where he seeks his patronage.

There appears also much unnecessary confusion caused by an apparent attempt to befog, rather than to clarify, the public mind in the use of terms such as "hydro-carbonate of lead," "basic carbonate of lead," "hydrate of lead," "carbonate of lead" in place of the term "white lead;" also, the use of the term "petroleum spirits," "naptha," "high boiling spirits," and "asphaltum spirits" for the more common and accurate term of "benzine." A less confused form of label could be devised to the advantage of manufacturers of paints, and, if we were seeking to instruct the public in right methods, it would seem as though there should be a unity of action looking toward simplifying, rather than bringing confusion, for the buyers of paints.

TRADE NAMES AND COMMON NAMES FOR PAINT PIGMENTS

There are frequent requests for information as to the chemical and common names for certain of the paint pigments, I am, therefore, re-printing the list as given in Bulletin No. 70, for a few of the more common terms.

Trade Names	Chemical Names
Barytes	Barium Sulphate.
Blanc Fixe	Precipitated Barium Sulphate.
Corroded Lead	Basic Lead Carbonate.
English White	Calcium Carbonate.
Gypsum	Calcium Sulphate Hydrated.
Lithophone	A combination of barytes, zinc oxide and zinc sulphide in various proportions.
Marble dust	Calcium carbonate.
Ochres	Silicate of Alumina Colored with Ferric Oxide.
Paris white	Calcium carbonate.
Ponolith	Similar to Lithophone..
Princess Mineral	Oxide of Iron.
Silex	Silica.
Silicate of Magnesia	Magnesium silicate, a natural earth product.
Silver white	Silica.
Spanish white	Calcium carbonate.
Sublimed White Lead	Apparently a Basic Lead Sulphate carrying a small portion of zinc oxide.
Terra Alba	Calcium sulphate.
Tuscan Red	Oxide of Iron.
White Lead	Basic Carbonate of Lead.
Whiting	Calcium carbonate.
Zinc Lead White	Composed of about equal parts lead sulphate and zinc oxide.
Zinc White	Zinc oxide.
Zinc Oxide	Zinc oxide.
Zinc Oxide (leaded)	Zinc oxide containing a varying amount of lead sulphate.

954—Prepared Paint, Semi-paste, Stag Paint, Exterior White, guaranteed to be made of perfectly pure materials. Hirshburg, Hollinder Co., Baltimore, Md.

Pigment	74.53%
Vehicle	25.47
Total	100.00%

Analysis of Vehicle	
Oil	87.70%
Volatiles	12.30
Total	100.00%

Analysis of Pigment	
Zinc oxide, ZnO	54.14%
White lead	8.67
Calcium carbonate, $CaCO_3$	6.55
Magnesium carbonate, $MgCO_3$	6.67
Mag. Silicates & Undet	23.97
Total	100.00%

What is "perfectly pure materials" and why should this paint be labeled so? Such forms of labeling are to say the least very misleading and tend to deceive the public who assume a white lead base is employed in the paint.

957—Mixed Paint, Outside White, Sterling Double Thick. Dozier & Gay Paint Co., Jacksonville, Fla.

Vehicle	22.66%
Pigment	77.34
Total	100.00%

Analysis of Vehicle	
Linseed oil	89.40%
Volatiles, (petroleum products)	10.60
Total	100.00%

Analysis of Pigment	
Barium sulphate, $BaSO_4$	6.14%
Calcium carbonate, $CaCO_3$	4.89
Zinc oxide, ZnO	50.32
Sublimed lead, $PbSO_4$	20.84
Sublimed lead, PbO	2.33
Silicates and undetermined	15.48
Total	100.00%

958—Semi-Paste Paint, Outside White, Seminole Brand. Knight & Wall Co., Tampa, Fla.

Pigment	71.91%
Vehicle	28.09
Total	100.00%

Analysis of Vehicle	
Linseed oil	85.60%
Benzine	14.40
Total	100.00%

Analysis of Pigment	
Sublimed lead, $PbSO_4$	12.37%
Sublimed lead, PbO	2.34
Zinc oxide, ZnO	59.66
Calcium carbonate, $CaCO_3$	5.16
Magnesium carbonate, $MgCO_3$	3.12
Mag. silicate & undetermined	17.35
Total	100.00%

961—Paint, Ready-for-use, Parian House Paint, Exterior White, Perfectly Pure, Best on Earth. Parian Paint Co., Atlanta, Ga.

Pigment	62.76%
Vehicle	37.24
Total	100.00%

Analysis of Vehicle	
Linseed oil	90.99%
Benzine	9.01
Total	100.00%

Analysis of Pigment	
Sublimed lead	26.78%
Zinc oxide, ZnO	47.02
Barytes	21.49
Carbonaceous matter	1.64
Silica	0.50
Undetermined	2.57
Total	100.00%

What is a "Perfectly Pure" paint and why is this paint to be considered as "Best on Earth?"

963—Paint, Highest Quality, Outside White, Towers. Towers Hardware Co., Jacksonville, Fla.

Pigment	65.85%
Vehicle	34.15
Total	100.00%

Analysis of Vehicle

Linseed oil	90.10%
Volatile oil (petroleum products)	9.90
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	23.04%
Sublimed lead, $PbSO_4$	51.27
Sublimed lead, PbO	13.88
Mag. silica & undetermined	11.81
Total	100.00%

964—Paint, White. H. B. Davis Co., Baltimore, Md.

Pigment	71.15%
Vehicle	28.85
Total	100.00%

Analysis of Vehicle

Linseed oil	90.40%
Benzine	9.60
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	58.46%
Sublimed lead, $PbSO_4$	12.40
Sublimed lead, PbO	2.79
Calcium carbonate, $CaCO_3$	4.71
Asbestine	21.31
Undetermined	0.33
Total	100.00%

970—Mixed Paint, Davis' 100% Pure, America's Standard of Excellence, Outside White. H. B. Davis Co., Baltimore, Md.

Pigment	61.10%
Vehicle	38.90
Total	100.00%

Analysis of Vehicle

Linseed oil	93.75%
Drier, (petroleum products)	6.25
Total	100.00%

Analysis of Pigment

White lead	49.54%
Zinc oxide, ZnO	49.53
Undetermined	0.93
Total	100.00%

1014—Gloss White, Outside Paint. Sherwin-Williams Co., Cleveland, Ohio.

Pigment	67.92%
Vehicle	32.08
Total	100.00%

Analysis of Vehicle

Linseed oil	93.58%
Benzine	5.14
Turpentine	1.28
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	33.55%
White lead	36.54
Sublimed lead, $PbSO_4$	19.88
Sublimed lead, PbO	0.54
Silicates and undetermined	9.49
Total	100.00%

1015—China Gloss White, Inside Paint. Sherwin-Williams Co., Cleveland, Ohio.

Vehicle	45.76%
Pigment	54.24
Total	100.00%

Analysis of Vehicle

Linseed oil and varnish	71.10%
Turpentine	19.65
Benzine	9.25
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	77.34%
Silicates	22.60
Undetermined	0.06
Total	100.00%

Probably the benzine should be included in the varnish.

1016—Prepared Paint, No. 485. Sherwin-Williams Co., Cleveland, Ohio.

Pigment	58.99%
Vehicle	41.01
Total	100.00%

Analysis of Vehicle

Linseed oil	87.52%
Benzine	1.72
Turpentine	9.08
Water	1.68
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	33.24%
White lead	30.81
Zinc sulphate	0.43
Sublimed lead, $PbSO_4$	22.42
Sublimed lead, PbO	0.98
Mag. silicate	8.99
Calcium carbonate, $CaCO_3$	1.52
Gypsum, $CaSO_3$	0.31
Iron oxide and undetermined	1.30
Total	100.00%

1017—Prepared Paint, Best Light Quaker Drab. Heath & Milligan, Chicago, Ill.

Pigment	62.86%
Vehicle	37.14
Total	100.00%

Analysis of Vehicle

Linseed oil	74.72%
Water	3.18
Turpentine	4.86
Benzine	17.24
Total	100.00%

Analysis of Pigment

White lead	18.75%
Zinc oxide, ZnO	41.53
Sublimed lead, $PbSO_4$	17.91
Sublimed lead, PbO	0.79
Calcium carbonate, $CaCO_3$	5.57
Barium sulphate, $BaSO_4$	6.61
Mag. silicate	1.64
Iron oxides	4.49
Silica, carbon & undetermined	2.71
Total	100.00%

1020—Mixed Paint, Outside White. T. L. Blood & Co., St. Paul, Minn.

Pigment	60.23%
Vehicle	39.77
Total	100.00%

Analysis of Vehicle

Linseed oil	94.73%
Water	0.30
Turpentine	3.68
Benzine	1.29
Total	100.00%

Analysis of Pigment

White lead	52.01%
Zinc oxide, ZnO	47.34
Undetermined	0.65
Total	100.00%

1021—Mixed Paint, "N. W." No. 29. T. L. Blood & Co., St. Paul, Minn.

Pigment	57.15%
Vehicle	42.85
Total	100.00%

Analysis of Vehicle

Linseed oil	92.41%
Water	1.93
Turpentine	5.10
Benzine	0.56
Total	100.00%

Analysis of Pigment

White lead	42.00%
Zinc oxide, ZnO	41.11
Iron oxide, Fe_2O_3	5.19
Calcium carbonate, $CaCO_3$	0.37
Silica and silicates	8.66
Undetermined	2.67
Total	100.00%

1022—Mixed Paint, "N. W." Inside White. T. L. Blood & Co., St. Paul, Minn.

Pigment	62.52%
Vehicle	37.48
Total	100.00%

Analysis of Vehicle

Linseed oil	66.25%
Water	1.86
Turpentine	28.71
Benzine	3.18
Total	100.00%

Analysis of Pigment

White lead	51.54%
Zinc oxide, ZnO	47.53
Undetermined	0.93
Total	100.00%

1023—Liquid Paint, Patton's Sun Proof Outside White. Patton Paint Co., Milwaukee, Wis.

Pigment	62.25%
Vehicle	37.75
Total	100.00%

Analysis of Vehicle

Linseed oil	91.66%
Water	0.56
Benzine	4.02
Turpentine	3.76
Total	100.00%

Analysis of Pigment

White lead	40.12%
Zinc oxide, ZnO	47.40
Calcium carbonate, $CaCO_3$	2.00
Silica and silicates	10.23
Undetermined	0.25
Total	100.00%

1024—Liquid Paint, Patton's Sun Proof, Inside White. Patton Paint Co., Milwaukee, Wis.

Pigment	63.19%
Water	0.91
Linseed oil and varnish	35.90
Total	100.00%

Analysis of Pigment

Calcium carbonate, $CaCO_3$	41.67%
Zinc oxide, ZnO	56.53
Mag. carbonate, $MgCO_3$	0.58
Silica, SiO_2	0.48
Unextracted matter	0.47
Undetermined	0.27
Total	100.00%

1025—Liquid Paint, No. 173, Patton's Sun Proof. Patton Paint Co., Milwaukee, Wis.

Pigment	61.98%
Vehicle	38.02%
Total	100.00%

Analysis of Vehicle

Linseed oil	91.10%
Water	0.51
Turpentine	3.39
Benzine	5.00
Total	100.00%

Analysis of Pigment

White lead	38.55%
Zinc oxide, ZnO	43.74
Iron and alumina, Fe_2O_3 and Al_2O_3	2.14
Calcium carbonate, $CaCO_3$	1.82
Silica and silicates	13.75
Total	100.00%

1026—House Paint, Outside White. Minnesota Linseed Oil Paint Co., Minneapolis.

Pigment	64.40%
Vehicle	35.60
Total	100.00%

Analysis of Vehicle

Linseed oil	89.86%
Benzine	1.42
Turpentine	7.46
Water	1.26
Total	100.00%

Analysis of Pigment

White lead	59.93%
Zinc oxide, ZnO	39.25
Undetermined	0.82
Total	100.00%

1027—House Paint, Inside White. Minnesota Linseed Oil Paint Co., Minneapolis.

Pigment	59.58%
Vehicle	40.42
Total	100.00%

Analysis of Vehicle

Linseed oil	72.30%
Water	1.70
Turpentine	22.10
Benzine	3.90
Total	100.00%

Analysis of Pigment

White lead	33.24%
Zinc oxide, ZnO	65.82
Undetermined	0.94
Total	100.00%

1028—House Paint, No. 18, Grey. Minnesota Linseed Oil Paint Co., Minneapolis.

Pigment	63.20%
Vehicle	36.80
Total	100.00%

Analysis of Vehicle	
Linseed oil	89.30%
Turpentine	7.06
Benzine	1.44
Water	2.20
Total	100.00%

Analysis of Pigment	
White lead	58.28%
Zinc oxide, ZnO	39.31
Iron & alumnina, (Fe_2O_3 & Al_2O_3)	0.18
Color and undetermined	2.23
Total	100.00%

1029—House Paint, Lion Brand, Inside White. St. Paul White Lead and Oil Co., St. Paul, Minn.

Pigment	49.75%
Vehicle	50.25
Total	100.00%

Analysis of Vehicle	
Linseed oil	88.45%
Water	2.00
Turpentine	7.85
Benzine	1.70
Total	100.00%

Analysis of Pigment	
White lead	17.11%
Zinc oxide, ZnO	80.00
Unextracted	0.91
Undetermined	1.98
Total	100.00%

1030—House Paint, No. 77, Lion Brand. St. Paul White Lead & Oil Co., St. Paul, Minn.

Pigment	56.07%
Vehicle	43.93
Total	100.00%

Analysis of Vehicle	
Linseed oil	89.80%
Water	2.80
Turpentine	6.10
Benzine	1.30
Total	100.00%

Analysis of Pigment	
White lead	37.57%
Zinc oxide, ZnO	56.17
Iron, alumina & manganese oxides	3.44
Carbonaceous matter	0.65
Silica and undetermined	2.17
Total	100.00%

1031—House Paint, Lion Brand, Outside White. St. Paul White Lead & Oil Co., St. Paul, Minn.

Pigment	60.66%
Vehicle	39.34
Total	100.00%

Analysis of Vehicle	
Linseed oil	88.70%
Water	2.90
Benzine	1.80
Turpentine	6.60
Total	100.00%

Analysis of Pigment	
White lead	57.12%
Zinc oxide, ZnO	46.58
Resinous matter	0.52
Undetermined	1.78
Total	100.00%

1032—New Era Paint. Acme Quality, Outside White. Acme White Lead & Color Works, Detroit, Mich.

Pigment	64.38%
Vehicle	35.62
Total	100.00%

Analysis of Vehicle

Linseed oil	86.66%
Water	4.26
Benzine	7.99
Turpentine	1.09
Total	100.00%

Analysis of Pigment

White lead	57.83%
Zinc oxide, ZnO	29.81
Calcium carbonate ($CaCO_3$)	6.61
Silica and silicates	5.71
Undetermined	0.04
Total	100.00%

1033—New Era Paint, Acme Quality. Acme White Lead & Color Works, Detroit, Mich.

Pigment	61.62%
Vehicle	38.38
Total	100.00%

Analysis of Vehicle

Linseed oil	83.65%
Water	4.20
Benzine	8.75
Turpentine	3.40
Total	100.00%

Analysis of Pigment

White lead	16.90%
Sublimed lead, $PbSO_4$	31.22
Sublimed lead, PbO	0.72
Zinc oxide, ZnO	37.21
Calcium carbonate, $CaCO_3$	4.39
Silica and silicates	7.82
Undetermined	1.74
Total	100.00%

1034—DeVoe Velour Finish, Inside White. DeVoe & Raynolds Co., Chicago and New York.

Pigment	68.20%
Vehicle	31.80
Total	100.00%

Analysis of Vehicle

Linseed oil and resin	51.70%
Benzine	37.58
Turpentine	6.12
Water	4.60
Total	100.00%

Analysis of Pigment

Lithophone Barytes, $BaSO_4$	60.50%
Lithophone zinc sulphide, ZnS	23.76
Lithophone zinc oxide, ZnO	0.90
Calcium carbonate, $CaCO_3$	13.79
Moisture	0.05
Undetermined	1.00
Total	100.00%

1035—DeVoe Lead and Zinc Paint, Outside White. DeVoe & Raynolds, Chicago and New York.

Pigment	56.08%
Vehicle	43.92
Total	100.00%

Analysis of Vehicle

Linseed oil	90.57%
Turpentine	7.10
Benzine	0.45
Water	1.88
Total	100.00%

Analysis of Pigment

White lead	50.52%
Zinc oxide, ZnO	48.58
Undetermined	0.90
Total	100.00%

1036—DeVoe Lead and Zinc Paint, Light Lead, No. 694. DeVoe & Raynolds Co., Chicago and New York.

Pigment	55.05%
Vehicle	44.95
Total	100.00%

Analysis of Vehicle	
Linseed oil	91.74%
Turpentine	6.82
Water	1.23
Benzine	0.21
Total	100.00%

Analysis of Pigment	
White lead	49.74%
Moisture and unextracted	0.92
Silicon dioxide, SiO_2	0.43
Zinc oxide, ZnO	46.43
Calcium carbonate, $CaCO_3$	0.79
Undetermined	1.69
Total	100.00%

1037—House Colors, Outside White, No. 993, Bradley & Vrooman Co., Chicago.

Pigment	62.01%
Vehicle	37.99
Total	100.00%

Analysis of Vehicle	
Linseed oil	89.43%
Benzine	4.13
Turpentine	3.23
Water	3.21
Total	100.00%

Analysis of Pigment	
White lead	51.70%
Zinc oxide, ZnO	31.80
Calcium carbonate	6.53
Silica and silicates	8.05
Undetermined	1.92
Total	100.00%

1038—House Colors, Slate No. 419. Bradley & Vrooman Co., Chicago.

Pigment	54.97%
Vehicle	45.03
Total	100.00%

Analysis of Vehicle	
Linseed oil	88.59%
Benzine	6.87
Turpentine	1.26
Water	3.28
Total	100.00%

Analysis of Pigment	
White lead	20.16%
Sublimed lead, $PbSO_4$	19.85
Sublimed lead, PbO	3.08
Zinc oxide, ZnO	37.35
Calcium carbonate, $CaCO_3$	9.40
Mag. carbonate, $MgCO_3$	0.89
Silica and silicates	8.63
Undetermined	0.64
Total	100.00%

NOTE: The manufacturers of this paint sell a white base and there is a tube containing the color which is mixed with the paint to produce the desired shade.

1039—House Paint, No. 867, Horse Shoe, French Gray. Mound City Paint & Color Co., St. Louis, Mo.

Pigment	58.34%
Vehicle	41.66
Total	100.00%

Analysis of Vehicle

Linseed oil	79.36%
Turpentine	11.73
Benzine	6.59
Water	2.32
Total	100.00%

Analysis of Pigment

White lead	34.95%
Zinc oxide, ZnO	53.96
Lead suphlate	8.30
Calcium carbonate, $CaCO_3$	0.39
Iron & manganese oxides	0.31
Silica, SiO_2	1.00
Undetermined	1.09
Total	100.00%

1040—Liquid Colors, Masury's Outside White. John Masury & Son, New York.

Pigment	60.40%
Vehicle	39.60
Total	100.00%

Analysis of Vehicle

Linseed oil	84.68%
Turpentine drier	13.67
Water	1.65
Total	100.00%

Analysis of Pigment

White lead	43.64%
Zinc oxide, ZnO	55.98
Undetermined	0.38
Total	100.00%

1041—Liquid Colors, Masury's Slate A Drab. John Masury & Son, New York.

Pigment	53.06%
Vehicle	46.94
Total	100.00%

Analysis of Vehicle

Linseed oil	89.35%
Turpentine drier	9.23
Water	1.42
Total	100.00

Analysis of Pigment

White lead	40.32%
Zinc oxide, ZnO	57.79
Color and undetermined	1.89
Total	100.00%

1072—Ready-mixed Paint, White. Norwood, Duquesne Paint Co., Pittsburgh, Pa.

Pigment	61.24%
Vehicle	38.76
Total	100.00%

Analysis of Vehicle

Linseed oil	62.23%
Benzine	28.77
Water	9.00
Total	100.00%

Analysis of Pigment

Calcium carbonate, $CaCO_3$	37.00%
Lithophone Barytes, $BaSO_4$	25.25
Lithophone Zinc sulphide, ZnS.	11.15
Lithophone zinc oxide, ZnO	1.29
Magnesium silicate	20.75
Magnesium carbonate	3.83
Undetermined	0.73
Total	100.00%

1073—Ready-Mixed Paint, Buff No. 74, Norwood. Duquesne Paint Co., Pittsburgh, Pa.

Pigment	57 91%
Vehicle	42.09
Total	100.00%

Analysis of Vehicle

Linseed oil	59.62%
Benzine	30.47
Water	9.91
Total	100.00%

Analysis of Pigment

Lithophone barytes, $BaSO_4$	22.80%
Lithophone zinc sulphide, ZnS	10.09
Lithophone zinc oxide, ZnS	1.80
Calcium carbonate, $CaCO_3$	34.76
Lead chromate	3.18
Iron and aluminum oxides	2.27
Mag. and Ca silicates	23.79
Undetermined	1.31
Total	100.00%

1074—Ready-Mixed Paint No. 917. W. L. Klingenhofer, Pittsburgh, Pa.

Pigment	62.79%
Vehicle	37.21
Total	100.00%

Analysis of Vehicle

Linseed oil	61.77%
Benzine	38.23
Total	100.00%

Analysis of Pigment

White lead	26.21%
Zinc oxide, ZnO	22.90
Iron oxide, Fe_2O_3	1.73
Calcium carbonate, $CaCO_3$	41.77
Silicates	5.85
Silicon dioxide & undetermined	1.54
Total	100.00%

1075—Ready-Mixed Paint, Outside White. W. L. Klingenhofer, Pittsburgh, Pa.

Pigment	64.52%
Vehicle	35.48
Total	100.00%

Analysis of Vehicle

Linseed oil	94.06%
Benzine	5.94
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	30.60%
Sublimed Lead $PhSO_4$	24.86
Sublimed lead, PbO	6.26
Calcium carbonate, $CaCO_3$	3.37
Aluminum oxide, Al_2O_3	1.74
Barytes, $BaSO_4$	6.31
Mag. silicate & undetermined	26.86
Total	100.00%

1077—White Lead, said to be Bridgeport Standard White Lead, prepared by Bridgeport Wood Finishing Co., Bridgeport, Conn.

Silica and silicates	32.87%
Sublimed lead, $PbSO_4$	28.14
Sublimed lead, PbO	3.11
Zinc oxide, ZnO	35.12
Undetermined	0.76
Total	100.00%

The circular accompanying the above states: "Bridgeport Standard White Lead is not a new product but has been on the market for over 40 years."

They say further: "We use a mixture of carbonate of white lead, pure oxide of white zinc, especially prepared pure floated white silex and pure linseed oil."

Analysis does not indicate that any true white lead has been used in this preparation.

Again they say: "The combination we use has been proved by exhaustive tests, made by the government and leading paint manufacturers and chemists, to be the best, judged by spreading, covering and lasting qualities."

They further state: "Bridgeport Standard White Lead is the most economical white lead on the market."

To say the least, there is considerable exaggeration. A good paint law would insure valuable information to the purchaser and place all manufacturers on the same basis.

1078—White Lead, Crescent City Brand. American Paint Works, New Orleans, La.

Pigment	91.27%
Vehicle	8.73
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	31.64%
Sublimed lead, $PbSO_4$	31.58
Sublimed lead, PbO	1.16
Zinc oxide	34.64
Undetermined	0.93
Total	100.00%

This product is not, therefore, as represented a white lead, In other words, it is a mixture of one-third barytes, one-third zinc oxide and one-third sublimed lead. Sold under a truthful label proper but sold as white lead it is a fraud.

1079—Prepared Paint No. 922, Light Stone, Climatic Brand. American Paint Works, New Orleans, La.

Pigment	64.40%
Vehicle	35.60
Total	100.00%

Analysis of Vehicle

Linseed oil	93.25%
Benzine	3.77
Turpentine	2.98
Total	100.00%

Analysis of Pigment

White lead	35.39%
Sulphate of lead	19.39
Zinc oxide, ZnO	22.01
Iron oxide	4.55
Silica and silicates	11.25
Calcium carbonate, $CaCO_3$	6.55
Color and undetermined	0.86
Total	100.00%

The label on this paint reads: "Sold subject to chemical analysis. We guarantee Climatic Prepared Paint to be composed entirely of the following materials: Strictly pure carbonate of lead, strictly pure oxide of zinc, strictly pure linseed oil, strictly pure turpentine drier, and such coloring matter as is required to produce the various shades. We guarantee that it contains no adulteration whatever."

This is a good strong guarantee, but the analysis does not bear out the claims made. In the first place, it contains more benzine than turpentine. In the next place, it contains of white lead 35.39 per cent and of zinc oxide 22.01 per cent; the balance is made up of other ingredients including sulphate of lead, silicates, iron oxides and calcium carbonate or lime.

Such statements as these show the necessity for a Paint Law that will force one to tell the truth and not misinform the public with regard to the character of the product which is being put out.

NOTE: The manufacturers for the above Climatic Paint insist that this is not an analysis of their best product, or, as they state, it is not a true and correct analysis of strictly pure Climatic Paint.

I am prepared, however, to affirm that the analysis is correct for the sample which we have examined. Possibly like their White Lead, they make more than one grade for the trade. This sample was in the unopened original container and as sold by the dealer.

Since writing the above the manufacturers, under date of March 3rd, state as follows:

"After careful thought it has come to our minds that you most probably have gotten hold of an old can of Climatic Paint."

They then state that the formula conforms more nearly to what we found in the above analysis.

They say further:

"This formula for Climatic Paint was used when Climatic was first placed on the market several years ago", but that they have now changed their formula to 60 per cent of white lead and 40 per cent zinc oxide.

Nevertheless, the above paint represents the product as purchased on the open market and the one that the dealer was handling and supplying to the public under a label intentionally misleading.

1083—American White Lead, ground in refined oil. Name and address of manufacturer not given. This particular sample was bought of Bonner-Preston Co., Hartford, Conn.

Pigment	91.63%
Vehicle	8.37
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	82.08%
Aluminum, Al_2O_3	0.90
Zinc oxide, ZnO	2.21
Zinc Sulphide, ZnS	2.65
Lead sulphate	10.79
Undetermined	1.37
Total	100.00%

This product is, therefore, falsely labeled, as might be expected, and contains no true white lead at all, but is mainly barytes. A good Paint Law would put a stop to such misleading claims and force the manufacturers to give their name and address.

1084—Banner White Lead, Strictly Pure. Wadsworth-Howland & Co., Boston, Mass.

Pigment	90.06%
Undetermined	9.94
Total	100.00%

Analysis of Pigment

White lead	99.37%
Undetermined	0.63
Total	100.00%

1085—White Lead in Paste, Komac Strictly Pure. The Kohlet-McLister Paint Co., Denver, Colo.

Pigment	92.02%
Vehicle	7.98
Total	100.00%

Analysis of Pigment

White lead	98.52%
Undetermined	1.48
Total	100.00%

1086—American White Lead, ground in Refined Linseed Oil. Name and address of manufacturer not given.

Pigment	91.86%
Vehicle	8.14
Total	100.00%

Analysis of Pigment

White lead	22.68%
Lead sulphate	2.27
Zinc oxide, ZnO	17.57
Barytes, $BaSO_4$	55.37
Silica and silicates	1.29
Undetermined	0.82
Total	100.00%

This product is not a white lead and the fact that the manufacturers did not care to give their name and address should be sufficient reasons for refusing to accept any product in paint lines. The analysis shows that the product is more than one-half barytes and less than one-fourth white lead.

1087—Citizen White Lead, Ground in Refined Linseed Oil. Citizen Paint Co., New Orleans, La.

Pigment	92.58%
Vehicle	7.42
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	7.91%
Zinc sulphide, ZnS	2.95
Lead sulphate	5.85
Barytes, $BaSO_4$	81.83
Undetermined	1.46
Total	100.00%

The above is labeled without any regard to honesty or the rights of the purchaser.

1088—American White Lead. Name and address of manufacturer not given. Label states: "Warranted ground from best and purest materials in pure bleached oil."

Pigment	90.18%
Vehicle	9.82
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	76.28%
Zinc oxide, ZnO	12.84
Zinc sulphide, ZnS	10.13
Undetermined	0.75
Total	100.00%

The analysis would indicate the presence of lithophone. A good Paint Law would not only require the manufacturer to give his name and address, but inform the public as to the composition of the product, and the product would not be labeled as white lead since it contains no white lead.

1089—White Lead, Pure White Lead, Dutch Boy Painter. National Lead Company.

Pigment	90.53%
Oil	9.47
Total	100.00%

Analysis of Pigment

White lead	99.22%
Undetermined	0.78
Total	100.00%

1090—Pure White Lead, P. P., Jas. H. Prince Co., Boston, Mass.

Pigment	92.04%
Oil	7.96
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	6.69%
Silicon dioxide, SiO_2	0.17
White lead	61.80
Sublimed lead, $PbSO_4$	25.97
Sublimed lead, PbO	1.98
Zinc oxide, ZnO	2.65
Undetermined	0.74
Total	100.00%

There is no justification for this form of false and deceptive labeling and again illustrates the need for paint laws to protect the public.

1091—White lead, strictly pure, marked E. P. & S. Co., M. B. Cochran, Pittsburgh, Pa.

Pigment	92.53%
Vehicle	7.47
Total	100.00%

Analysis of Pigment

White lead	49.12%
Lead sulphate, $PbSO_4$	41.66
Lead oxide, PbO	5.81
Zinc oxide, ZnO	2.84
Undetermined	0.57
Total	100.00%

Not satisfied with labeling this as "white lead," they add the further statement, "strictly pure." The value of this pigment I do not question, but I do question the purpose of the present form of label.

1092—Lilly White Lead. Bindley Hardware Co., Pittsburgh, Pa.

Pigment	92.53%
Vehicle	7.47
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	45.02%
Sublimed lead, $PbSO_4$	32.74
Sublimed lead, PbO	5.29
Zinc oxide, ZnO	15.90
Alumnia, Al_2O_4	0.20
Silica, SiO_2	0.10
Undetermined	0.75
Total	100.00%

This product contains no true white lead at all, but is nearly one-half barytes, a little more than one-third sublimed lead, and the balance mainly zinc.

1093—Clifton White, Ground in Pure Linseed Oil. American White Lead Works, Cincinnati, Ohio.

Pigment	92.19%
Vehicle	7.81
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	83.20%
Sublimed lead, $PbSO_4$	3.98
Sublimed lead, PbO	0.33
Zinc oxide, ZnO	12.38
Undetermined	0.11
Total	100.00%

While this product is not called "white lead" the fact that it is known as "Clifton White" put out by the American White Lead Works, leads one to expect that at least it is made up largely, if not wholly, of white lead, when as a matter of fact, it contains no true white lead at all and only a very slight amount of sublimed lead.

1094—Union White. Forest Paint & Varnish Works, Cleveland, Ohio.

Pigment	93.38%
Vehicle	6.62
Total	100.00%

Analysis of Pigment

Barium sulphate, $BaSO_4$	76.50%
White lead	10.17
Lead sulphate	7.49
Zinc sulphide, ZnS	2.26
Zinc oxide, ZnO	1.55
Silica, SiO_2	0.49
Undetermined	1.54
Total	100.00%

1097—Peco. The Paint Efficiency Co., John F. Jordan, Chicago, Ill.

According to the pamphlet distributed with a sample of so-called "Peco," we read the following:

"'PECO,' a paint emulsifier for painters' use. Saves you 40 per cent of cost on every gallon of pure linseed oil and lead or any other pigment paint (except oxide of iron), that you mix or use."

Again they say:

"'PECO' is a chemical compound in powdered form packed in capsules of uniform quantity, each capsule containing powder sufficient to make one quart of water increase one quart of pure linseed oil and lead or any other pigment to two quarts."

They say further:

"It is not going too far to say that among the many marvels of the Twentieth Century inventions, nothing in the sphere of chemistry or mechanics, is of more economic value than the 'PECO' process of uniting WATER and PURE Linseed Oil and pigment paint of any kind (except oxide of iron)."

"This is accomplished by adding to the WATER a small quantity of a Chemical Compound called 'PECO,' and stirring the WATER so mixed into the paint, GALLON FOR GALLON. Radical as this 'PECO' process may seem on first thought, it is based on sound common sense. FLEXIBILITY is a prime requisite in arrest of disintegration after paint is applied to any object or surface. To acquire and retain FLEXIBILITY, moisture must be present in the OIL for as long a period as possible."

Certainly, this is a wonderful preparation, judged by the claims made by the manufacturers, in that it makes paint go twice as far as it otherwise would, and, presumably, it will wear equally as well.

What is this preparation? A qualitative examination of a sample distributed by a representative of the Company showed this product to consist of basic lead carbonate (white lead), zinc oxide, barytes, and small amounts of silica.

The claims made for this product are highly exaggerated and absurd. The preparation is a good one to leave alone, and the painter who uses it is simply deceiving his customers and injuring his business.

1098—Household Paint, Gray Lead, Quality Guaranteed. The McMurty Mfg. Co., Denver, Colo.

Pigment	58.31%
Vehicle	41.69
Total	100.00%

Analysis of Vehicle

Linseed oil	86.06%
Benzine	5.39
Turpentine	4.24
Water	4.31
Total	100.00%

Analysis of Pigment

White lead	28.26%
Sublimed lead	24.49
Zinc oxide, ZnO	29.51
Silica and silicates	8.06
Calcium carbonates, $CaCO_3$	7.76
Color and undetermined	1.92
Total	100.00%

1099—Outside White Paint, Campbell's Quality. Campbell Glass and Paint Co., St. Louis, Mo.

Pigment	64.47%
Vehicle	35.53
Total	100.00%

Analysis of Vehicle

Linseed oil	88.07%
Benzine	7.07
Turpentine	0.96
Water	3.90
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	35.95%
Sublimed lead	30.76
White lead	21.39
Silicates (magnesium)	10.21
Moisture and undetermined	1.69
Total	100.00%

The label bears a formula which states that the vehicle contains linseed oil 95 per cent, turpentine and Japan drier 5 per cent. The analysis does not bear out this statement in that there is over 7 per cent of benzine, nearly 4 per cent of water and less than 1 per cent of turpentine.

1100—Mixed Paint, No. 185, The Best Paint. Para Paint Co., Cleveland, Ohio.

Pigment	54.69%
Vehicle	45.31
Total	100.00%

Analysis of Vehicle

*Unidentified material	59.31%
Benzine	36.62
Turpentine	4.07
Total	100.00%

Analysis of Pigment

Barytes, $BaSO_4$	16.84%
Zinc suphilde, ZnS	7.02
Zinc oxide, ZnO	17.57
Calcium carbonate, $GaCO_3$	44.25
Magnesium carbonate, $MgCO_3$	1.68
Iron oxide, Fe_2O_3	0.46
Silica and silicates	10.09
Color and undetermined	2.09
Total	100.00%

*The fixed oil was mixed with organic coloring material which could not be readily separated, consequently, we are unable to identify the oil in the vehicle.

It will be noticed that this paint contains no white lead at all, and that more than one-third of the vehicle is benzine.

1101—Ready Mixed Paint, No. 347. Para Paint Co., St. Louis, Mo.

Pigment	69.30%
Vehicle	30.70
Total	100.00%

Analysis of Pigment

Organic matter	1.91%
Silicon dioxide	1.06
Barytes, $BaSO_4$	28.71
Calcium carbonate, $CaCO_3$	37.54
Zinc oxide, ZnO	23.09
Iron and Alumina, Fe_2O_3 and Al_2O_3	2.11
Sublimed lead	5.57
Undetermined	0.01
Total	100.00%

This label contains the following:

"We guarantee this paint not to crack, peel, or chalk off, to cover more surface, wear longer and look better than any other paint."

From the small quantity of material we were unable to determine the composition of the vehicle, but certainly the character of the pigment does not indicate that the claims made would be expected to be borne out with regard to the wearing properties of the paint.

1103—Genuine White Lead. Banner Color Works. Address not given.

Pigment	88.47%
Vehicle	11.53

Analysis of Pigment

Barytes, $BaSO_4$	75.97%
Silica, SiO_2	1.16
Calcium carbonate, $CaCO_3$	7.40
Zinc oxide, ZnO	9.46
Zinc sulphide, ZnS	1.83
Lead sulphate, $PbSO_4$	3.39
Undetermined	0.79
Total	100.00%

This product, instead of being as claimed a genuine White Lead, contains no white lead at all and is mainly barytes with very little of zinc oxide.

1104—Washburn Standard White. A combination of white lead, zinc oxide, and pure floated silex. It is whiter and wears better. Ira D. Washburn Co., Cincinnati, Ohio.

Pigment	87.66%
Vehicle	12.34
Total	100.00%

Analysis of Pigment

White lead	15.67
Sublimed lead	17.20
Zinc oxide, ZnO	33.34
Calcium carbonate, $CaCO_3$	0.73
Silicon dioxide, SiO_2	24.85
Barytes, $BaSO_4$	7.24
Undetermined	0.97
Total	100.00%

1105—Liquid Paint, High Standard, Silver Gray No. 292. Lowe Bros. Co., Dayton, Ohio.

Pigment	61.42%
Vehicle	38.58
Total	100.00%

Analysis of Vehicle

Linseed oil	86.50%
Water	1.52
Benzine	8.98
Turpentine	3.00
Total	100.00%

Analysis of Pigment

White lead	44.37%
Lead sulphate	3.69
Zinc oxide, ZnO	34.14
Calcium carbonate, $CaCO_3$	4.94
Iron and alumina, Fe_2O_3 and Al_2O_3	0.65
Silica and silicates	11.90
Undetermined	0.31
Total	100.00%

1109—Gibbsboro French Ochre. John Lucas & Co., Philadelphia.

Pigment	75.37%
Vehicle	24.63
Total	100.00%

Analysis of Pigment

Silicon dioxide, SiO_2	56.99%
Magnesium oxide, MgO	1.30
Alumina, Al_2O_3	17.87
Iron oxide, Fe_2O_3	14.47
Lead chromate	3.24
Water and undetermined	6.13
Total	100.00%

This product is not a true French ochre.

1108—Mixed Paint, Derby French Gray, James H. Prince Paint Co., Boston Mass.

Pigment	48.64%
Vehicle	51.36
Total	100.00%

Analysis of Vehicle

Linseed oil	70.32%
Benzine	9.36
Turpentine	1.04
Water	19.28
Total	100.00%

Analysis of Pigment

White lead	19.46%
Sublimed lead	25.90
Barytes, $BaSO_4$	4.30
Silica and silicates	2.94
Calcium carbonate, $CaCO_3$	1.36
Magnesium carbonate, $MgCO_3$	0.21
Zinc oxide, ZnO	43.23
Iron oxide, Fe_2O_3	0.61
Color and undetermined	1.99
Total	100.00%

The product is labeled as "best wearing paint made, guaranteed one-half gallon." The actual measure showed 1.48 quarts. The paint vehicle which is made up of 19.28 per cent water and 9.36 per cent benzine, can hardly be looked upon as "the best wearing paint made."

1111—Gloss Paint, No. 207, Silver Gray. John Lucas & Co., Philadelphia.

Pigment	51.56%
Vehicle	48.44
Total	100.00%

Analysis of Vehicle

Linseed oil	91.66%
Benzine	7.92
Turpentine	0.42
Total	100.00%

Analysis of Pigment

White lead	13.35%
Basic lead sulphate	20.04
Zinc oxide, ZnO	40.50
Silicates	24.55
Color and undetermined	1.56
Total	100.00%

1112—Prepared Paint, No. 707, Light Gray. John Lucas & Co., Philadelphia.

Pigment	64.49%
Vehicle	35.51
Total	100.00%

Analysis of Vehicle

Linseed oil	87.86%
Benzine	10.06
Turpentine	0.42
Water	1.66
Total	100.00%

Analysis of Pigment

Zinc oxide, ZnO	17.97%
Sublimed lead	15.56
Barium sulphate	34.19
Magnesium silicate & undet.	32.28
Total	100.00%

1113—Mixed Paint, High Grade, No. 110, Pearl Gray. Koehler & McLister Paint Co., Denver, Colo., for The Humphrey-Jones Paint Co., Denver, Colo.

Pigment	65.75%
Vehicle	34.25
Total	100.00%

Analysis of Vehicle

Sample too small for full analysis.

Water	9.34%

Analysis of Pigment

White lead	14.88%
Sublimed lead, $PbSO_4$	24.58
Sublimed lead, PbO	6.84
Zinc oxide, ZnO	13.77
Calcium carbonate, $CaCO_3$	26.05
Silica and silicates	4.99
Mag. carbonates, $MgCO_3$	1.28
Iron oxide, Fe_2O_3	0.37
Organic matter, color and undetermined	7.24
Total	100.00%

1114—Atlantone Paint, French Gray. Atlas Paint Co., New York and Nashville, Tenn.

Pigment	52.73%
Vehicle	47.27
Total	100.00%

Analysis of Vehicle

Fixed oil and resins	54.61%
Benzine	40.85
Turpentine	4.54
Total	100.00%

Analysis of Pigment

Silica and silicates	26.48%
Lithophone	49.24
Zinc oxide, ZnO	7.77
Lead sulphate	10.89
Calcium carbonate, $CaCO_3$	2.16
Magnesium carbonate, $MgCO_3$	1.72
Color and undetermined	1.74
Total	100.00%

This paint contains considerable cheap benzine varnish.

Since making the foregoing analysis for Atlantone Paint, the Department has received the following statement from the manufacturers:

"Some time ago we discontinued the manufacture of Atlantone Paint in the quality that you have analyzed under your Laboratory No. 1114, and all of our stocks of paint in the East were called in, and replaced with a very much better quality paint, as we found that this old Atlantone brand was not at all suitable for use in the East.

"We wish to state, also, that our Company has established a reputation for paints of excellent quality, and, in selling the Atlantone brand of paint, we do so practically under protest, and state **specifically** at the sale that, in view of the price at which we are selling this paint, we cannot guarantee any results. In times like the present, we find it is absolutely necessary to offer a cheap quality paint, as a large number of our customers will not pay the price of a strictly pure product."

1117—Standard House Paint, Ready-Mixed, Elastic Durable, Pearl Gray. Standard Linseed Co., Cleveland, Ohio.

Pigment	56.24%
Vehicle	43.76
Total	100.00%

Analysis of Vehicle

Linseed oil	72.93%
Benzine	19.90
Turpentine	3.52
Water	3.65
Total	100.00%

Analysis of Pigment

Silicates and silica	7.72%
Lithophone, $BaSO_4$	30.97
Lithophone, ZnS	14.14
Lithophone, ZnO	0.37
Lead sulphate	14.84
Magnesium carbonate, $MgCO_3$	0.32
Calcium carbonate, $CaCO_3$	29.89
Iron and alumina, Fe_2O_3 and Al_2O_3	0.83
Color and undetermined	0.92
Total	100.00%

A letter accompanying this paint says:

"Our Standard High Grade Mixed Paints are made from the best quality white lead, chemically pure colors, ground in pure linseed oil, thoroughly and uniformly mixed by modern machinery, thereby assuring you of durability and elasticity."

It will thus be observed that an attempt is made to give the impression that white lead is an important feature of this paint, when, as a matter of fact, true white lead is not present, and sublimed lead constitutes less than 15 per cent of the paint, or approximately one-half as much as there is of lime, calcium carbonate; while, the vehicle contains a large proportion of benzine.

WHITE-WASH

Of late there have been numerous requests for information with regard to a good white-wash and I am, therefore, publishing the method as described in special bulletin No. 23 in Volume I., as one of the most satisfactory formulas that have been generally suggested, known as the "Government Lighthouse Formula," as follows:

"Slack one-half bushel of lime with boiling water, keeping it covered during the process. Strain it, add a peck of salt dissolve in warm water; three pounds ground rice put in boiling water and boiled to a soft paste; one-half pound Spanish whiting; and one pound clear glue dissolved in warm water. Mix these well together and let the mixture stand for several days. Keep the wash thus prepared in a kettle or portable furnace. When used put it on as hot as possible with painter's or white-wash brush."

1126—Ready-Mixed Paint, Seroco Brand, No. 243, Outside White. Name and address of manufacturer or jobber not given.

The information furnished, together with the labels that appear upon the can, lead us to believe that the product is put out by Sears-Roebuck & Co., Chicago, Ill

Volume of paint—2.02 quarts.

Pigment	65.81%
Vehicle	34.19
Total	100.00%

Analysis of Vehicle

Linseed oil	88.4%
Benzine	9.0
Water	1.4
Turpentine	1.2
Total	100.0%

Analysis of Pigment

Basic lead sulphate	25.64%
Zinc oxide, ZnO	26.36
Barium sulphate, $BaSO_4$	5.21
Calcium carbonate, $CaCO_3$	35.02
Silicates and undetermined	7.77
Total	100.00%

1127—Mixed House Paint, Tower Brand, Outside White, No. 11. Montgomery, Ward & Co., Chicago, Ill.

Volume of paint	2.07 quarts
Pigment	55.38%
Vehicle	44.62
Total	100.00%

Analysis of Vehicle

Linseed oil	83.36%
Turpentine	3.73
Benzine	6.43
Water	6.48
Total	100.00%

Analysis of Pigment

Basic lead sulphate	36.37%
Zinc oxide, ZnO	36.55
Barium sulphate, $BaSO_4$	7.16
Magnesium carbonate, $CaCO_3$	3.34
Calcium carbonate, $CaCO_3$	2.12
Silicates and undetermined	14.16
Total	100.00%

This does not conform with the analysis as given upon the label which states that the white base is composed of sublimed white lead 50 per cent, zinc oxide 50 per cent, and makes no mention of the presence of other paint ingredients or of benzine and water, both of which are present in marked quantities.

1128—Mixed Paint, "Cover-All" Brand, No. 11, Outside White. Montgomery, Ward & Co., Chicago, Ill.

Volume of paint	0.98 quarts.
Pigment	54.72%
Vehicle	45.28
Total	100.00%

Analysis of Vehicle

Linseed oil	88.77%
Turpentine	1.51
Benzine	5.35
Water	4.37
Total	100.00%

Analysis of Pigment

Basic lead sulphate	29.47%
Zinc oxide, ZnO	29.67
Calcium carbonate, $CaCO_3$	27.30
Magnesium carbonate, $Mg\ CO_3$	2.52
Silica & Silicates	10.16
Undetermined	0.88
Total	100.00%

1129—Ready-Mixed Pure Paint, Long Life Master Painters No. 343, Outside White. Labeled, Illinois Paint Works, Chicago, Ill. On a label upon the back of the can is given the name of Sears, Roebuck & Co., Chicago.

Volume of paint	1.96 quarts
Pigment	60.87%
Vehicle	39.13
Total	100.00%

Analysis of Vehicle

Linseed oil	89.95%
Turpentine	8.44
Benzine	1.61
Total	100.00%

Analysis of Pigment

Basic lead sulphate	67.24%
Zinc oxide, ZnO	31.96
Benzine	0.80
Total	100.00%

METHOD OF VARNISH ANALYSIS

By R. W. Darner

The analysis of oil varnishes is one of great difficulty and it is almost impossible with the present methods in use—McIlhiney's, Scott's and Twitchel's for separation of gum and oil, to get better than an approximate estimate of the ingredients in a varnish. The following analysis will illustrate a typical case. A varnish was made up in a 60 gallon batch, using the following ingredients:

Rosin	4.00%
Kauri	22.80
Oil	31.80
Litharge	1.50
Thinners	39.90

By McIlhiney's method the following results were obtained:

Rosin	3.2%
Kauri	17.6
Oil	38.1
Litharge	1.4
Thinners	39.7

The proportion of volatile thinner in a varnish is easily and accurately determined by steam distillation and the aromatic hydrocarbons, petroleum products and turpentine in the volatile can be determined with a fair degree of accuracy. But the volatile or thinner in a varnish least concern the varnish maker. The important questions to him are the proportion of oil to gum and the amount of rosin present. From the above analysis it can be seen that the per cent of oil, gum and rosin is too inaccurate to be of much value.

McIlhiney's method (1) was the first attempt scientifically to analyze a varnish composed of gum and oil, but this method presents several serious difficulties. It has been found by the writer that resins after being heated and some of the volatile matter driven off, have a marked solubility in absolute alcohol. The following table will show the effect on the solubility of driving off different per cents of volatile matter from kauri.

The highest temperature reached in driving off the volatile in this experiment was 650° F.

Solubility of Kauri in Absolute Ethyl Alcohol

Original Kauri	15% Volatile	20% Volatile	25% Volatile
5.68% residue	72.57%	78.11%	79.12%

In McIlhiney's method the oxidized oils are separated from the precipitated gums by absolute alcohol. By referring to the above table it will be seen that on an average 25 per cent of the gum will be lost. Also, there are many chances for unavoidable error and loss in manipulation. In separating the petroleum ether layer the gums frequently stick to the sides of the separatory funnel and are lost. Errors creep in in the evaporation of solvents

Twitchel's method has been found to give fairly good results for total gums. Methods have been devised for separating the rosin from the hard gum obtained by Twitchel's method, but none give certain results.

Gill (2) suggested a method for the separation of gum and rosin based on comparative ester values; the ester value being the difference between the acid number and the saponification number. Gill determined the acid number by direct titration. This method is open to serious objections.

Dietrich (3) and Worstall (4) have shown that direct titration gives too low an acid number. Their experiments show that the neutralization of the resin acids proceeds slowly and if time enough is given that the acid number becomes identical with the saponification number.

It was found by the writer that the amount of volatile driven off influenced the acid number of the resin. The Acid numbers given in the following table were determined by the indirect method of Dietrich.

	Original	15% Volatilized	20% Volatilized
Kauri No. 1	97.63%	49.21	44.15
Kauri No. 2	123.00%	56.62	50.12

As a large number of varnishes are now being made entirely of China wood oil and rosin, or China wood oil substituting part of the linseed oil, another error has crept into the methods or varnish analysis. The China wood oil partially polymerizes on being heated in the manufacture of the varnish, and in the McIlhiney method this polymerized product will separate out as gum.

Scott's (5) method for separation of oil from gums gives too low results on short oil varnishes and it is almost impossible to use it on long oil varnishes at all on account of the impossibility of getting the oil and gum to separate in the petroleum ether. The low results with short oil varnishes are caused by the solubility of rosin in petroleum ether. The question arose if it was not possible to get a fraction of petroleum ether that would dissolve the rosin in a varnish and at the same time precipitate the hard gums. It was found that petroleum ether having a specific gravity of 0.670 containing fractions between 50 and 80 degrees Centigrade would dissolve rosin. It was also found that this solution could be cooled to 3°C. with only 5 per cent on an average of the rosin precipitatiing out. As it is impossible to use Scott's method with long oil varnishes, a new manipulation had to be adopted.

The varnish was spread out on an Adams filter coil, this placed in a thimble and extracted in a Caldwell extractor that the bottom had been cut out. The method as modified is as follows:

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(1) Chem. Eng. Aug., 1908.

(2) Jour. Amer. Chem. Soc. Dec., 1906.

(3) Analyse der Harze, Balsane und Gumminhartze.

(4) Jour. Amer. Chem., Sec. XXV, page 860.

(5) Drugs, Oils and Paints, XV, No. 4, p. 132, No. 6, p. 219.

Three to four grams of varnish are spread out on an Adam's filter coil which has been dried and weighed along with an extractive thimble. The coils absorb water rapidly and for this reason the coils and thimble must be weighed in a weighing bottle. The varnish is best weighed and added to the coil from a dropping bottle. The coil is then held in the mouth of a 300 c. c. weighed Erlenmeyer flask, and 100 c. c. of petroleum ether, 0.670 sp. gr., added slowly. A large percentage of the varnish will be washed out of the coil by this treatment. The coil is then placed in the extraction thimble and extracted for 36 hours, or until extraction is complete. 150 c. c. of petroleum ether, 0.670 sp. gr., is then added to the flask and the flask cooled to 3°C., until the gums settle and the liquid is clear.

The liquid containing the oils and rosin is poured off the gums and the flask washed several times with petroleum ether and the washings added to the original petroleum ether extract. The Erlenmeyer flask and thimble are then dried at 105° C., to constant weight. The increase in weight of the flask and thimble minus the weight of the metallic driers represents the weight of hard gums in the varnish. The extract from the gums is freed of the petroleum ether, saponified with ½N alcoholic potash and the unsaponifiable matter extracted with ether. The rosin and fatty acids are then released with ½N hydrochloric acid and extracted with ether. The acids are then freed of the ether and the rosin determined by Twitchel's method.

The following tables will show the accuracy of the method.

Analysis of Long Oil Varnishes

	Hard Gums		Rosin		Oils		Thinners
Varnish	Estimated	Found	Estimated	Found	Estimated	Found	
No. 1	11.26	11.55	2.66	2.89	39.67	39.31	46.16
No. 2	13.24	12.87	2.74	3.01	40.87	41.02	43.10
No. 3	13.96	15.01	....	....	48.12	47.04	37.95
No. 4	....	....	8.25	7.94	32.30	32.61	59.45

No. 1 and No. 3 contain kauri gum; No. 2 contains Manila gum. Nos. 1 and 2 contain all linseed oil; No. 3 contains 28.78 per cent linseed oil and 18.91 per cent China wood oil. No. 4 contains all China wood oil.

When China wood oil is contained in a varnish, the polymerized portion is thrown down by this method as a flocculent precipitate which can be separated from the gums as the gums stick to the flask and the polymerized oil does not.

No. 4 represents an average analysis that can be got by this method on China wood oil and rosin varnishes.

The following table will show the results obtained on medium and short oil varnishes.

Analysis of Medium and Short Oil Varnishes

	Per Cent Gum		Per Cent Rosin		Per Cent Oil		Thinners
Varnish	Estimated	Found	Estimated	Found	Estimated	Found	Per Cent
No. 1	22.8	22.5	4.00	4.2	31.8	31.0	41.4
No. 2	....	....	22.7	22.1	29.2	29.7	48.2
No. 3	17.1	17.4	5.7	5.9	29.2	28.7	48.0
No. 4	11.2	10.7	11.3	12.1	30.5	30.2	47.0
No. 5	5.7	5.4	18.0	17.7	29.8	30.4	46.5
No. 6	13.1	12.8	4.4	4.1	32.8	33.4	49.7
No. 7	32.5	31.1	....	....	29.8	31.2	37.7
No. 8	17.7	17.5	....	....	36.4	36.6	45.9
No. 9	18.9	19.4	3.5	3.4	35.5	35.1	42.1

Varnishes Nos. 1, 3, 4, 5 and 6 were made of Kauri gum; No. 7 of Sierre Leone; Nos. 8 and 9 of Manila gum. Nos. 7, 8 and 9 contain both China wood and linseed oils. This method depends for its accuracy upon getting the proper fractions of petroleum. This can be easily regulated by trying it out on a varnish of known composition. If gums run too high and the rosin low, there is too much of the low fractions present and the results may be corrected by adding fractions distilling between 70° and 80° Centigrade.

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NORTH DAKOTA AGRICULTURAL COLLEGE
GOVERNMENT AGRICULTURAL
EXPERIMENT STATION
OF
NORTH DAKOTA

Bulletin No. 92

PAINTS: THEIR SERVICE CONDITION

—BY—

E. F. Ladd and E. E. Ware

Any farmer, teacher, or student in the State may have this Bulletin mailed to his address, free of charge, upon application.

FARGO, NORTH DAKOTA, U. S. A.
June, 1911

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INTRODUCTION

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each individual case, even for the side of the
test.

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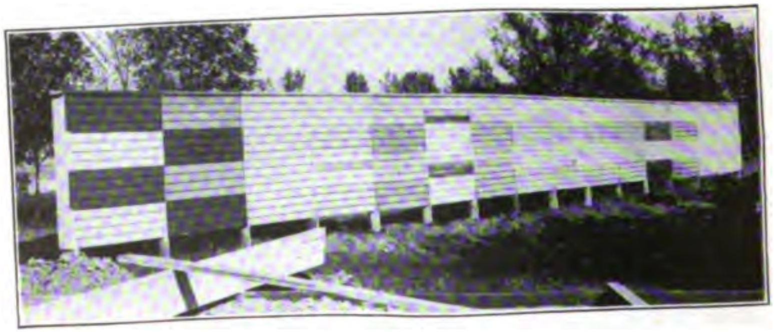

(Original test fence built in 1906, east side before repainting in 1910)

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By E. F. Ladd and E. E. Ware

INTRODUCTION

The first extensive paint experiments undertaken at the College were begun in 1906, when there was erected the first paint test fence of 15 sections, known as the original test fence. On this fence there were applied several commercial paints representing several types, including some of the well-known catalog-house paints and white leads. The purpose of these experiments was to secure data which would enable us to judge something of the practical value of the paints and whether the analysis of a paint would indicate anything of the value of the paint for the purposes for which paints are to be used.

Since then a large number of additional experiments have been undertaken, and there have been erected four additional test fences, each much larger than the original. In addition to these fences, fourteen buildings, including residences and public buildings, have been painted, some for the first time and in other cases the buildings have been re-painted. Paints which have been tested upon the experimental fences have also been used upon buildings, in order that data might be secured under both conditions. The fence tests show a more accelerated wearing for the paints than where the paints were used upon houses. Nevertheless, the conditions are identical throughout on the fences and thus give results much more comparable for different paints and different types of lumber, than would be the case upon buildings where the conditions varied in each individual case, even for the side of the building under test.

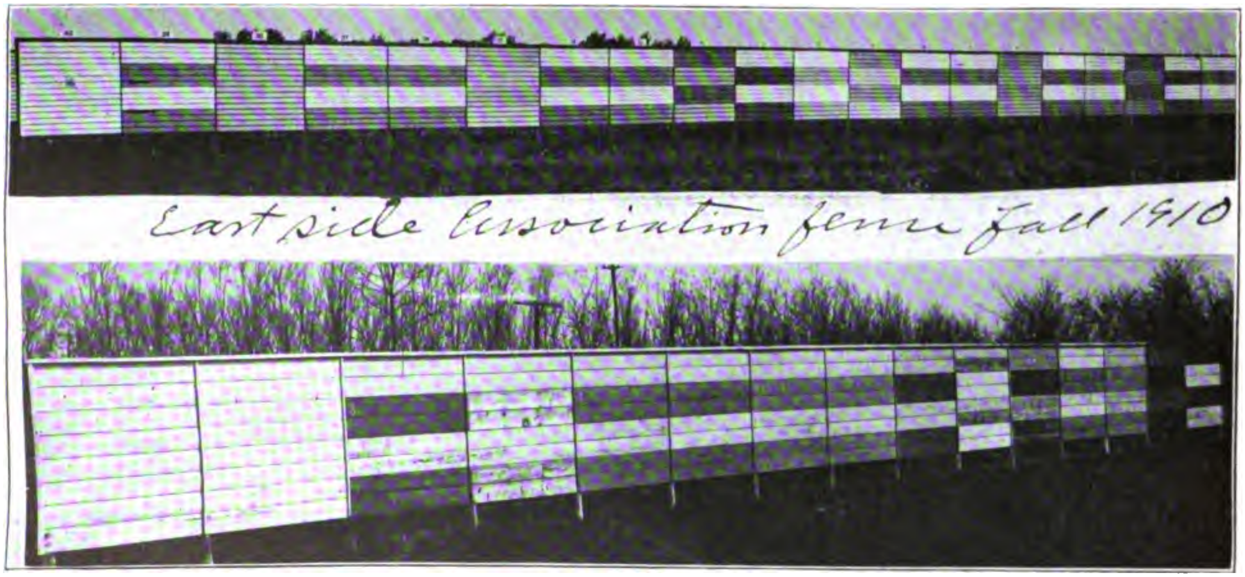
The construction of the fences is well shown in the cut. The fences have been fully described in previous bulletins from this Department, particularly No. 81. Two types of clapboards are used on one side of the fence, namely soft pine and cedar. On the other side of the fence, as shown in the illustration, boards of two types are used, one soft pine and the other Minnesota Hard Pitch Pine. This has furnished a splendid opportunity for a comparison of the relative value of paints upon different types of lumber where the paints are all put on under the same general conditions.

The work on these fences was undertaken in co-operation with the Paint Manufacturers' Association of the United States, and for the original painting they furnished a representative who was present and took part in the work, also in connection with a representative of the National Lead Company, who was present and aided in the reduction of the white leads and their application.

It is not our purpose, at this time, to draw general conclusions with regard to the relative value of the several paints. Experience has taught us that often a paint which wears well does not necessarily form a good basis for repainting; that the second paint, while apparently unsatisfactory in its wearing qualities, may have its source of trouble in the original paint. It is, therefore, necessary before drawing general conclusions to have the work repeated in the re-painting of the several tests as first made.

Each year additional experiments have been carried on, and at the present time it is proposed to continue these experiments for a series of years, extending the number of the tests so as to cover fields not yet touched upon. In this connection the Department has purchased a complete experimental paint plant for the manufacture of its own paints for certain lines of experimental work.

In going over the results, as presented in this bulletin, the data presented is for the conditions as found at the time of making the inspection in the fall of 1910. For convenience, the paints have been grouped in classes of like composition and properties, so as to make possible a better study



Shows West Side Construction of one of Test Fences Before Repainting

for those who may be interested in going over the data. Each may draw his own conclusions from the data as presented.

The characteristics of the different types of paints are in some cases quite marked, as are the conditions of checking, peeling, scaling, etc. The data presented shows also the general harmful effects of the presence of water in paints; the effect of applying paints where the lumber is not thoroughly dry; and to some extent there are experiments showing the relative value of other oils used in part or whole for linseed oil. There are certain experiments showing the value of substitutes for turpentine. It may be said that the use of a small quantity of turpentine has generally proved beneficial, while the addition of a large amount of turpentine has brought about conditions unsatisfactory as shown in the wearing quality of the paint.

For the present year particular attention is to be given to the question of substitutes for linseed oil and substitutes for turpentine. The results of these experiments will form the basis of future reports from this Department.

1911 REPORT OF TEST FENCES AND HOUSES

In compiling this report on conditions of test fences painted in 1906, 1907, 1908 and test houses painted in 1907, 1908, 1909, an endeavor has been made to so group the results as to bring together paints of similar type, thus to facilitate the comparison of such similar types under varying conditions, as well as to show the action of differing types under identical conditions of exposure.

The report will follow the same general lines as have the previous reports put out by the Department, except that no formulæ will be given, each test being referred to simply by number, the formulæ corresponding to these numbers being given in full in Station Bulletin 81, Paint Bulletin No. 2, or Paint Bulletin No. 4.

The descriptive terms employed will be the same as used in previous reports; but, inasmuch as the clear interpretation of the results necessarily depends largely upon the reader's understanding of such terms as may have been used, it has seemed advisable to insert at this point, definitions of the terms as used, with illustrations showing how they have been applied to conditions existing on the test fences and houses.

GENERAL CONDITION

Summarizes the conditions observed in the test, the general appearance, wear, and characteristic disintegration of the paint surface. :

CONDITION FOR RE-PAINTING

This important factor runs parallel in most cases to the general condition of the paint surface. The requirements here being almost entirely modified by the surface of the paint and the amount of disintegration it shows. However, other features, such as heavy chalking, or a very hard, flinty surface, which will not allow of a ready penetration, etc., must be considered. Probably the most treacherous surface is the one where the old disintegrated surface will in time flake, forcing off the new paint.

COVERING PROPERTIES

This condition was judged entirely from the concealment of the surface of the wood, afforded by the paint coat. The tints almost invariably offered good hiding qualities, but not so the whites. Especially where the chalking was excessive the concealment was very noticeably lessened.

COLOR

The white tests, alone, were observed for color. This condition was modified considerably by the hiding power of the paint. Portions of lumber that show through the paint influence a yellowish or brownish tinge. This was demonstrated clearly in tests 102 and 103, where two coats were applied over an ochre primer. The color of the three coat test was good, while that of the two coats over an ochre primer was of a pronounced brawny nature, due to the ochre surface showing through.

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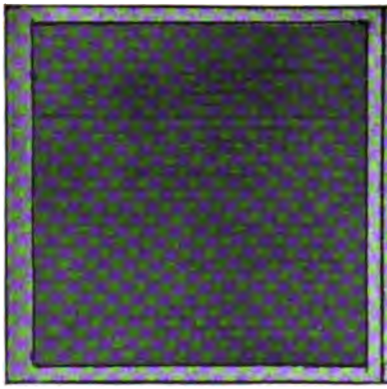

Fig. 1. Surface with no noticeable defect.

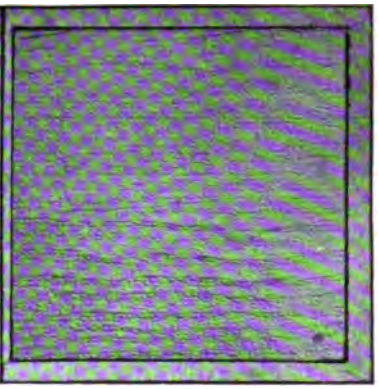

Fig. 2. Surface showing checking.

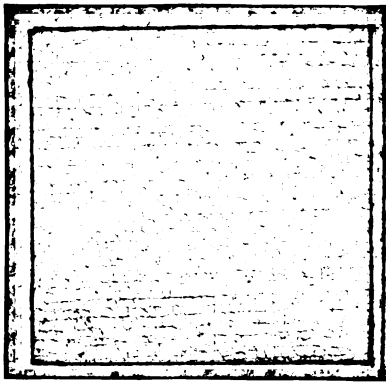

Fig. 3. Checking more pronounced than in Fig. 2.

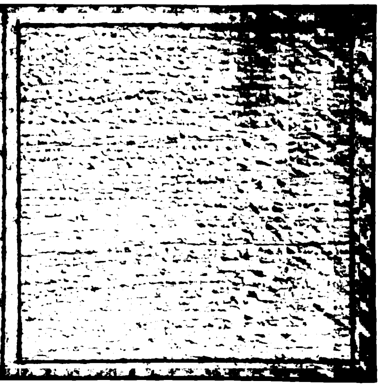

Fig. 4. Alligatoring.

CHALKING

This condition was made as nearly comparable as possible, by rubbing equal sizes of black velvet cloth over equal representative surfaces on the several tests. Care was taken that all other conditions were the same. These strips of cloth were then placed into several groups and in this manner fairly accurate judgment could be made.

PHYSICAL CONDITION OF PAINT SURFACE

This condition is undoubtedly the most important observed. Special care was exercised in determining the characteristic and thoroughtly representative wear of each test, the extent of the disintegration of the paint film, etc., while in most cases this could be determined by the naked eye, it was deemed advisable to use magnification, and throughout the inspection a hand-glass magnifying eight diameters was used. With this glass it was possible to note the finest break in the film, also to determine its depth and nature.

There are several distinct features noted. First, *checking*, entirely a surface defect. It is due to the contraction of the surface and exhibits a "crazed" or broken appearance, extending down to the priming coat in places, but never reaching to the surface of the wood. This is characteristic of Corroded White Lead, and also, in a measure, of Sublimed White Lead.

ALLIGATORING

Is a very pronounced or excessive checking. Here the break in the surface almost invariably extends to the priming. The contraction in this case is abnormally great. In checking and alligatoring the breaks in the surface extend in every direction, with varying degrees of uniformity.

CRACKING

Is the condition observed in the paint film where the break extends through to the wood. It may be, and generally is, along the grain of the lumber, or it may be, as is sometimes noticed, in any direction. Cracking is the fore-runner of greater defects, for it allows the moisture to get to the wood, capillary attraction carries it throughout the wood and soon small pieces of the paint film curl up at the edges of the broken surfaces and come off. This is called *Flaking*. A more pronounced condition arises where large pieces of the paint film become loosened, and Scaling is noted.

PEELING

Was not found in any of the tests. This is an abnormal condition, due to adverse conditions of painting or improper application, and not the outcome of natural wear.

GLOSS

Used in its real meaning could not be applied to the tests. Rubbing will invariably reveal a fairly glossy surface by reflected light, but as this creates an abnormal condition it was deemed best not to report on this feature.

CLASSIFICATION OF TESTS

The tests will be taken up in the order of their relation to the individual pigments, corroded white lead, sublimed white lead, and zinc oxide. Then will be classed together the paints that may be mixtures of these individuals in different proportions, but without the admixture of other constituents.

This brings out as a separate division such paints as may have been compounded from one or more of these bases, with such additions as calcium carbonate, barium sulphate, magnesium silicate, silica, etc.

In addition to such tests, a few were run, in which the variable quantity was the vehicle, some having the turpentine added in amounts differing from usual practice, while others had their turpentine replaced either partially or wholly by benzine.

The illustrations used will be from tests, that, in our opinion, show conditions average of all tests in the particular group to which each particular one belongs; and it will be upon these representative tests alone, that a complete report will be given covering soft pine and cedar, east ex-

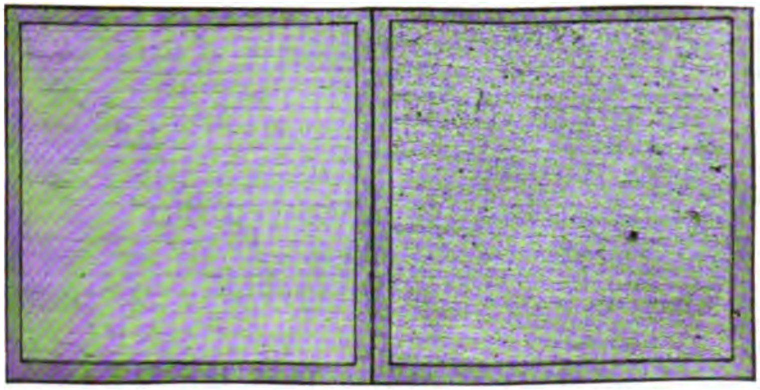

Fig. 5. and Fig. 6. Pronounced checking together with slight cracking.

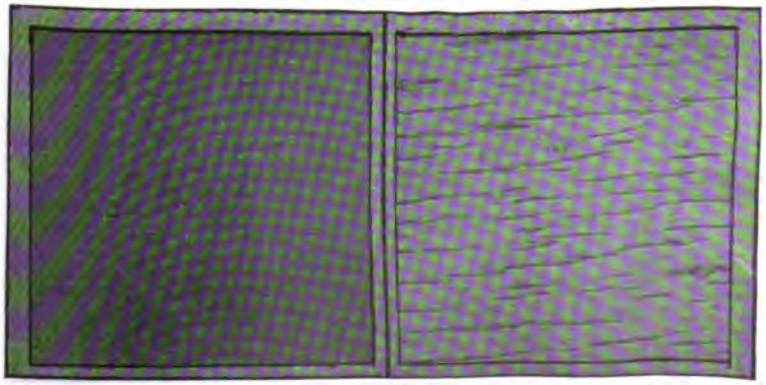

Fig. 7 and Fig. 8. Cracking in advanced stage.

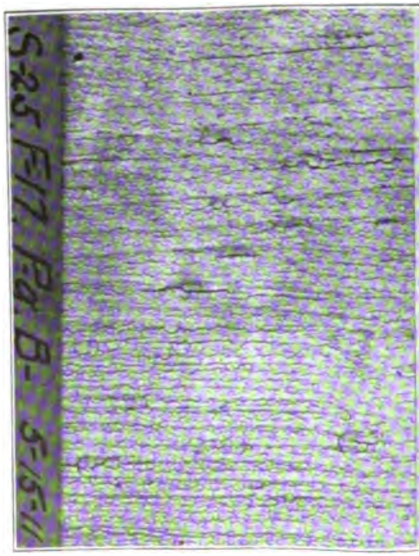

Fig. 15. Corroded White Lead, Hard Pine.

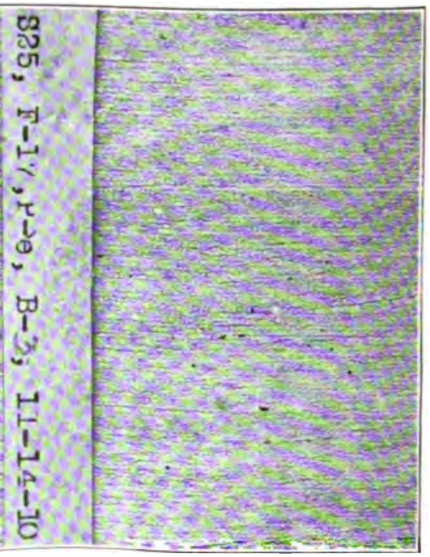

Fig. 16. Corroded White Lead, Soft Pine.

posure; hard and soft pine, west exposure. In reporting on all other tests, data will be given upon soft pine, east exposure, the concensus of opinion being that the relative differences in condition are the same.

It may be well to emphasize the fact that the classification here used is one entirely of convenience, rather than an attempt to rank the different paints according to an individual idea of relative quality.

GROUP I. A. This group includes all of the corroded white leads.

Where the test was made under unusual conditions of vehicle or surface, reference is made to the group in which such special test is reported.

B
LARGES
NEW YORK.
262 Pea
P
CINCINNATI,
323 5th

GROUP I. b.

SUBLIMED WHITE LEAD

The examples of sublimed white lead used as an individual pigment are limited to two on the test fences and two on house tests.

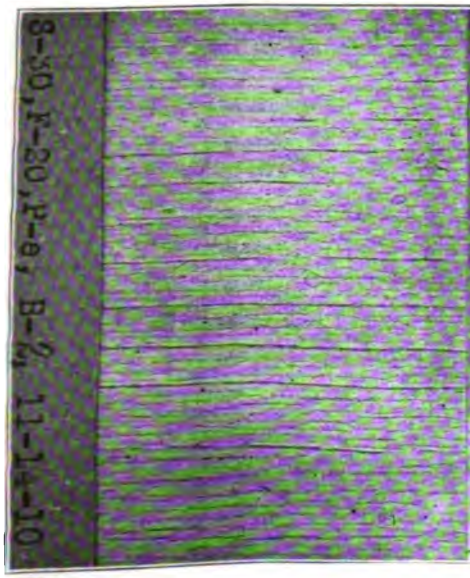

Fig. 17. Sublimed White Lead.

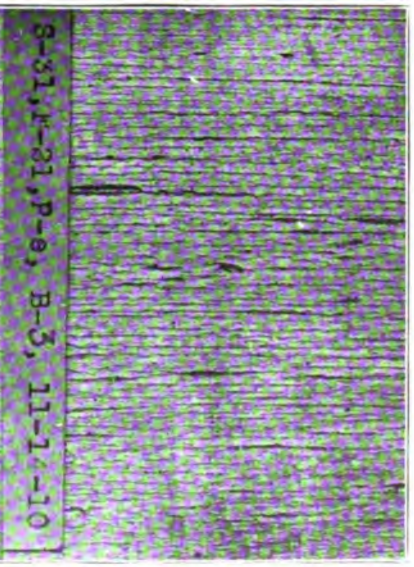

Fig. 18. Zinc Oxide.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
30a	20	White	Poor	Poor	Med	Good	Heavy	....	....	Badly	....	Consid.
b	....	Grey	Poor	Poor	Fair	Good	Heavy	....	....	Badly	....	Consid.
c	....	White	Poor	Poor	Med	Good	Heavy	....	....	Badly	....	Consid.
d	....	Grey	Poor	Poor	Fair	Good	Heavy	....	....	Badly	....	Consid.
e	....	White	Med	Med	Med	Good	Heavy	....	....	V. Badly	....	Slight
f	....	Grey	Med	Med	Fair	Good	Heavy	....	....	Consid.	....	....
g	....	White	Poor	Poor	Med	Good	Heavy	....	....	V. Badly	....	....
h	....	Grey	Med	Poor	Fair	Good	Heavy	....	....	Consid.	....	....
2'06	2	White	Fair	Med	Fair	Good	Heavy	Consid.	....	Slight	....	....
H 2	....S....	Brown	Fair	Fair	.....	.....	Badly	Slight	....	V. Slight	....	....
H 2	....N....	Brown	Med	Med	.....	.....	Badly	Slight	....	Con (hail)	....	....
H 3	....E....	White	Fair	Fair	Good	Good	Consid.	Slight	....	Consid.	....	....

GROUP I. c.—ZINC OXIDE

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
31a	21	White	V P	Poor	Good	Poor	V. Slight	....	....	V. Badly	....	V. Badly
b	....	Grey	V P	Poor	Good	.....	V. Slight	....	....	V. Badly	....	V. Badly
c	....	White	Poor	Poor	Good	Poor	V. Slight	....	....	V. Badly	....	Badly
d	....	Grey	Med	Poor	Good	.....	V. Slight	....	....	Badly	....	Slight
e	....	White	Poor	Poor	Good	Poor	V. Slight	....	....	V. Badly	....	Consid.
f	....	Grey	Med	Med	Good	.....	V. Slight	....	....	Badly	....	Slight
g	....	White	Poor	Poor	Good	Poor	V. Slight	....	....	V. Badly	....	Consid.
h	....	Grey	Med	Med	Good	.....	V. Slight	....	....	Badly	....	Slight
44e	SIT 10	White	Fair	Fair	Good	Med	V. Slight	....	....	Consid.	....	....

GROUP II. MIXTURES OF INDIVIDUAL PIGMENTS

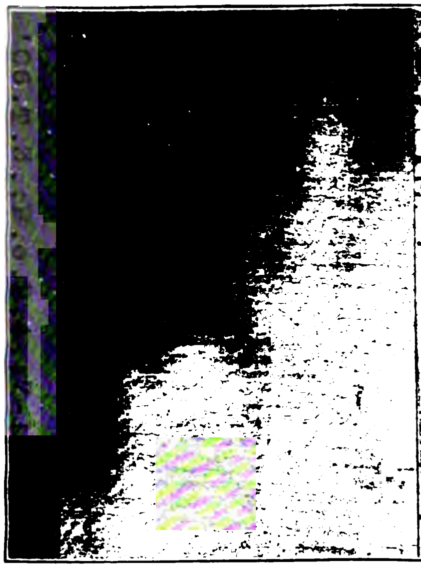

Fig. 19. Corroded White Lead 50, Zinc Oxide 50; 4 years exposure.

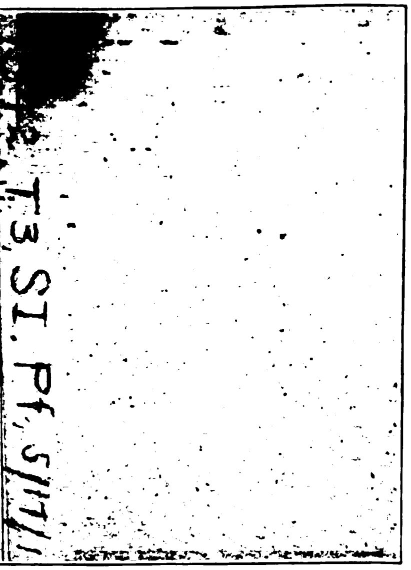

Fig. 20. Corroded White Lead 80, Zinc Oxide 20; 4 years' exposure.

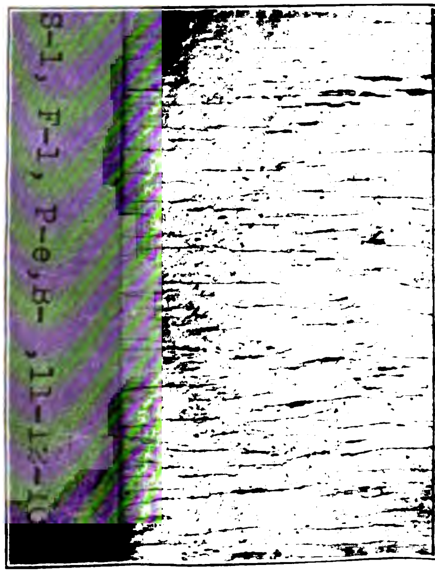

Fig. 21. Corroded White Lead 30, Zinc Oxide 70; Soft Pine; 3 years' exposure.

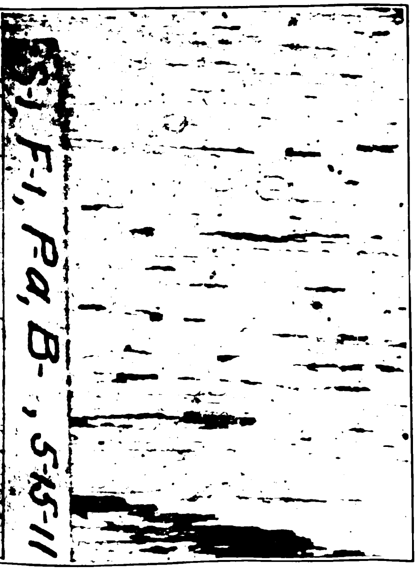

Fig. 22. Corroded White Lead 30, Zinc Oxide 70; Hard Pine; 3½ years' exposure.

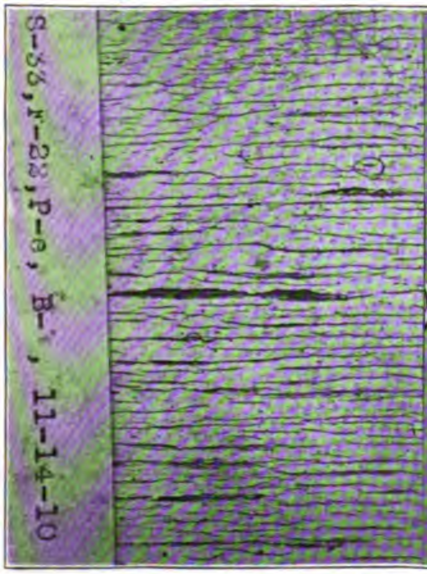

Fig. 23. Standard Zinc Lead White.

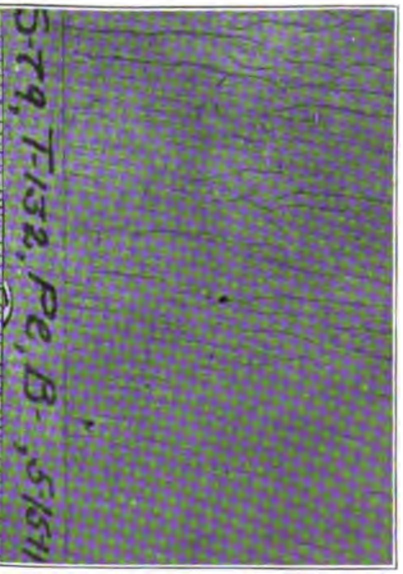

Fig. 24. Sublimed White Lead 60, Zinc Oxide 40.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
3a	3-06	White	Fair	Fair	Good	Fair	Slight	Consid	....	Slight	Slight	....
b	....	Grey	Fair	Fair	Good	.....	Slight	Consid.	....	Slight	Slight	....
c	....	White	Poor	Poor	Good	Med	Slight	Consid.	....	Badly	Badly	alonggrain
d	....	Grey	Med	Poor	Good	.....	Slight	Consid.	....	Badly	Consid.	....
e	....	White	Fair	Med	Good	Fair	Slight	Consid.	....	Consid.	Slight	....
f	....	Grey	Fair	Med	Good	.....	Slight	Consid.	....	Consid.	Consid.	....
g	....	White	Fair	Med	Good	Fair	Slight	Consid.	....	Consid.	Consid.	....
h	....	Grey	Fair	Med	Good	.....	Slight	Consid.	....	Consid.	Consid.	....
65f	101	White	Good	Fair	Good	Good	Medium	Consid.	....	Consid.	....	....
1e	1	White	Poor	Poor	Good	Poor	V. Slight	....	....	Badly	Badly	Medium
79e	132	White	Med	Poor	Fair	Fair	Consid.	....	....	Badly	....	....
42e	SI T2	White	Fair	Fair	Good	Fair	Consid.	Badly	....	Badly	Slight	....
70e	114	Drab	Fair	Poor	Good	Good	Consid.	Consid.	....	Consid.	Slight	....
70f	115	Drab	Fair	Poor	Good	Good	Medium	Consid.	....	Badly	Slight	....
72e	118	Drab	Good	Good	Good	.....	Medium	Slight	....	Consid.	....	....
H 10	52 S	Green	Good	Fair	Good	.....	....	Slight	Consid.	....	....	....
	N	Green	Good	Med	.....	.....	....	....	....	....	....	....
H 10	50 N	Green	Med	Med	.....	.....	....	V. Slight	....	Medium	....	*
	S	Green	Good	Good	Good	.....	....	....	....	....	....	....
H 10	51 N	Green	Fair	Poor	.....	.....	....	Slight	....	....	....	....
	S	Green	Good	Good	Good	.....	....	V. Slight	....	....	....	....
5-'06e	5	White	Poor	Poor	Fair	Fair	Slight	....	....	Badly	Badly	....
H 3	1 N	White	Fair	Fair	Good	Good	....	Consid.	....	Medium	....	....
	S	White	Fair	Med	Good	Fair	Slight	....	....	Medium	....	....
H8	1 N	Drab	Med	V P	Fair	.....	....	....	....	Badly	Consid.	Consid.

* Paint coat brittle.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
H 13	1 E	Drab	Med	Poor	.....	.....	....	....	....	Badly	V. Slight	....
	W	Drab	Med	Poor	.....	.....	....	....	....	Badly	V. Slight	....
43f	SI-T7	White	Poor	Poor	Good	Poor	Slight	Slight	....	V. Badly	Consid.	....
79a	132	White	Poor	Poor	Good	Fair	Consid.	....	....	V. Badly	....	Consid.
c	....	White	Poor	Poor	Good	Fair	Consid.	....	....	V. Badly	....	....
e	....	White	Med	Poor	Fair	Fair	Consid.	....	....	Badly	....	....
g	....	White	Poor	Poor	Fair	Fair	Consid.	....	....	Badly	Slight	....
4–06e	4	White	Med	Med	Good	Fair	Consid.	Slight	....	Badly	Consid.	....
77f	129	Grey	Fair	Poor	Good	.....	Slight	....	....	Consid.	....	Slight
77e	128	White	Med	Poor	Fair	Med	Slight	....	....	Badly	....	Slight
33e	22	White	Poor	Poor	Good	Fair	Medium	....	....	V. Badly	....	Bd.,

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
42f	SI-T3	White	Fair	Fair	Good	Fair	Consid.	Consid.		Badly	Consid.	
42g	SI-T4	White	Good	Good	Good	Med	Medium	Consid.		Slight		
72f	119	Drab	Good	Good	Good		Medium					
H.1	2 N	Drab	Med	Med				Slight		Consid.*		
	S	Drab	Med	Med			Consid.			Badly		
H.2	11 E	Drab	Good	Good								
	W	Drab	Poor	Poor						V. Badly	Slight	
H.4	2 E	White	Fair	Fair	Good	Good				Medium		
H.7	11 W	Drab	Fair	Fair	Good		Slight	Consid.		Medium		
H.8	2 N	Drab	Fair	V. Poor	Fair					Badly *		
H.10	53 N	Green	Good	Fair								
	S	Green	Good	Good	Good			V. Slight	Consid.	Slight		
H.13	11 N	Drab	Good	Good	Good							
	S	Drab	Good	Good	Good							
H.13	2 E	Drab	Fair	Fair						Consid.	Slight	
	W	Drab	Fair	Fair						Consid.	Slight	
42h	SI-T5	White	Fair	Fair	Good	Med	Medium	Consid.		Slight		
10e	7	White	Poor	Poor	Good	Med				Badly		Consid.
14'06	16	Yellow	Fair	Fair	Good		Slight	Consid.		Consid.	Slight	
H.4	7 N	White	Med	Med	Good	Good				Medium		
H.13	7 E	Drab	Fair	Fair						Consid.		
	W	Drab	Fair	Fair						Consid.		
43e	SI-T6	White	Med	Med	Good	Poor	Slight	Slight		Consid.		

* Due to hail.

GROUP III.

INDIVIDUAL PIGMENT AND INERT

This class is represented by zinc and inert, there being no tests in which either of the other basic pigments is used with an inert without the presence of one of the other bases.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
10f	-12- 06	White	Good	Good	Good	Good	Consid.	Slight	....	Slight	Slight	....
11e	-13- 06	See Group V c.										
79f	133	Fawn	Poor	Poor	Good	.....	Medium	....	....	Badly	Slight	....
13f	-15- 06	Grey	Med	Med	Good	.....	....	....	....	Consid.	Consid.	....
9e	6	White	V P	Poor	Good	Poor	....	....	....	V. Badly	Badly ...	....
H.4	6 E	White	Med	Med	Good	Fair	....	....	....	Badly	....	....
H.13	6 E	Drab	Fair	Fair	.....	.....	....	....	....	Consid.	....	....
	W	Drab	Fair	Fair	.....	.....	....	....	....	....	....	....
13e	9	White	Med	Poor	Good	Med	....	....	....	Badly	....	Consid.
H.3	9 N	White	Fair	Fair	Good	Good	....	....	....	Consid.	....	....
	S	White	Med	Med	Good	Good	Consid.	....	....	....	....	....
H.13	9 N	Drab	Good	Good	Good		....	....	....	....	....	....
	S	Drab	Good	Good	Good	.....	....	....	....	....	....	....

GROUP IV. LEAD, ZINC AND INERT

Representatives of this class are numerous, the examples selected showing conditions average for this group.

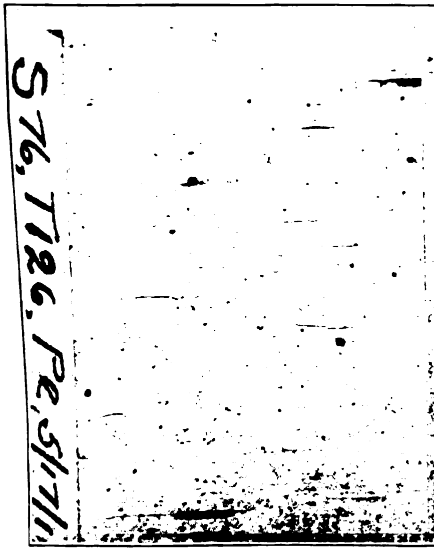

Fig. 25. Corroded White Lead, Zinc Oxide, Silica; Soft Pine.

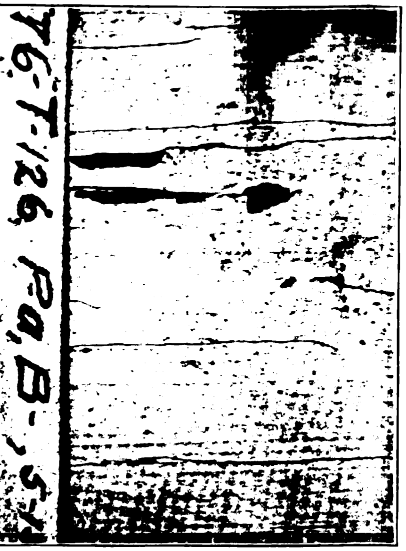

Fig. 26. Corroded White Lead, Zinc Oxide, Silica; Hard Pine.

Fig. 27. Sublimed White Lead, Zinc Lead, Zinc Oxide, Calcium Carbonate.

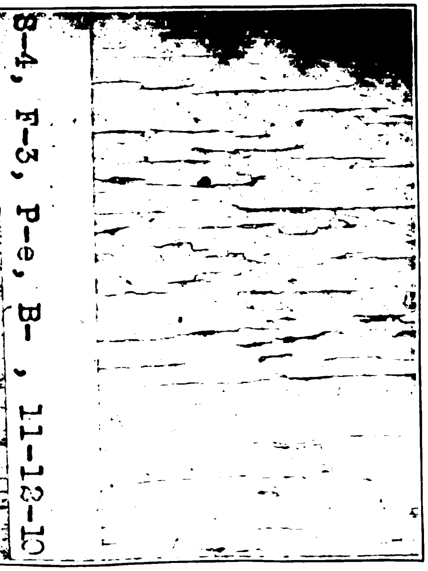

Fig. 28. Corroded White Lead, Sublimed White Lead, Zinc Oxide, Calcium Carbonate.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
12a	8	White	V P	Poor	Good	Med	Slight	....	....	V. Badly	....	V. Badly
b	....	Grey	V P	Poor	Good	.....	Slight	....	....	V. Badly	....	V. Badly
c	....	White	Poor	Poor	Good	Med	Slight	....	....	Badly	....	Consid.
d	....	Grey	Poor	Poor	Good	.....	Slight	....	....	Badly	....	Consid.
e	....	White	Med	Med	Good	Fair	Slight	....	....	Badly	....	Slight
f	....	Grey	Med	Med	Good	.....	Slight	....	....	Consid.	....	Slight
g	....	White	Poor	Poor	Good	Fair	Slight	....	....	V. Badly	....	Badly
h	....	Grey	Fair	Fair	Good	.....	Slight	....	....	Medium	....	Badly
22a	15	White	V P	Poor	Good	.....	Medium	....	....	V. Badly	....	V. Badly
f	....	Grey	Poor	Poor	Good	.....	Medium	....	....	Badly	....	Badly
c	....	White	Poor	Poor	Good	.....	Medium	....	....	Badly	....	Badly
d	....	Grey	Med	Poor	Good	.....	Medium	....	....	Badly	....	Slight
e	....	White	Med	Poor	Good	Fair	Medium	....	....	Badly	....	Slight
f	....	Grey	Fair	Fair	Good	.....	Medium	....	....	Consid.	....	Slight
g	....	White	Poor	Poor	Good	Fair	Medium	....	....	Badly	....	Consid.
h	....	Grey	Med	Poor	Good	.....	Medium	....	....	Badly	....	Slight
4a	3	White	Poor	Poor	Good	Fair	Medium	....	....	V. Badly	....	Badly
b	....	Grey	Poor	Poor	Good	.....	Medium	....	....	Badly	....	Badly
c	....	White	Poor	Poor	Good	Fair	Medium	....	....	Badly	....	Badly
d	....	Grey	Med	Poor	Good	.....	Medium	....	....	Badly	....	Badly
e	....	White	Poor	Poor	Good	Fair	Medium	Slight	....	Badly	....	Consid.
f	....	Grey	Fair	Med	Good	.....	Medium	Medium	....	Badly	....	Badly
g	....	White	Fair	Fair	Good	Good	Medium	....	....	Medium	Slight	Slight
h	....	Grey	Good	Fair	Good	.....	Medium	....	....	Consid.	....	Slight
										Slight		....

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
6e	6'06	White	Good	Good	Good	Fair	Slight	Consid.	....	Slight	Slight	....
8e	8'06	White	Good	Good	Good	Fair	Slight	Consid.	....	Consid.	Slight	....
6e	4	White	V P	Poor	Good	Poor	Slight	....	....	V. Badly	Badly	....
7e	5	White	Fair	Fair	Good	Fair	....	....	....	Consid.	....	Slight
76e	126	White	Poor	Poor	Good	Fair	Slight	....	....	Badly	....	Slight
15e	10	White	Poor	Poor	Good	Med	Slight	Medium	....	V. Badly	Badly	....
18e	12	White	V P	Poor	Good	Med	Slight	Medium	....	Badly	....	Badly
24e	16	White	Poor	Poor	Fair	Med	Slight	....	....	Consid.	....	Consid.
73e	120	White	Poor	Poor	Good	Med	....	....	....	Badly	....	Slight
73f	121	Drab	Med	Poor	Good	.....	....	....	....	Badly	....	Slight
75e	124	White	Poor	Poor	Fair	Poor	Medium	....	....	V. Badly	....	Slight
76f	127	Grey	Poor	Poor	Good	Fair	Slight	....	....	Badly	....	Slight
H.1	4 W	Drab	Good	Fair	Good	.....	....	....	....	V. Slight	....	....
	E	Drab	Med	Med	.....	.....	Consid.	Slight	....	Consid.	....	....
H.13	4	Drab	Fair	Fair	Good	.....	....	Slight	....	Medium	....	....
H.2	5 S	Brown	Good	Good	.....	.....	....	....	....	....	....	....
	N	Brown	Poor	Poor	.....	.....	....	....	....	....	....	....
H.6	15 N	Yellow	Fair	Fair	Good	Good	....	V. Badly	....	Hail	....	....
	S	Yellow	Good	Good	Good	Good	....	....	....	....	....	....
H.13	5 W	Drab	Fair	Fair	Fair	Fair	....	....	....	Slight	....	....
H.12	5 N	White	Med	Poor	.....	.....	....	Slight	....	V. Badly	Badly	Bd in spots
	S	White	Fair	Fair	Good	Good	....	Slight	....	Slight	....	....
9e	10'06	See Group V c.										
10	11'06	White	Fair	Fair	Fair	Med	Slight	Consid .	....	Consid.	Slight	....

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
H.4	8 S	White	Med	Med	Good	Good	Slight	Consid.	....	Slight	....	....
H.9	8 S	Drab	Good	Good	....	....	....	....	....	....	....	....
	N	Drab	Good	Fair	....	....	....	....	....	....	....	....
H.10	8 W	Green	Good	Good	Good	....	....	....	....	....	....	....
	E	Green	Good	Good	....	....	....	....	....	....	....	....
H.13	8 S	Drab	Fair	Fair	....	....	....	....	....	Medium	....	....
H.5	10 E	Yellow	Good	Good	....	....	Slight	V. Slight	....	....	....	....
	W	Yellow	Poor	Poor	(Hail)		....	....	....	V. Bad *	....	....
H.6	10 E	Yellow	Fair	Fair	Fair	Fair	Slight	....	....	Medium	....	....
	W	Yellow	Poor	Poor	Fair	Fair	....	....	....	Badly	Slight	....
H.7	10 W	Drab	Poor	Poor	Fair	....	Slight	Consid.	....	V. Badly	Consid.	(hail)
	E	Drab	Med	Med	Good	....	Slight	Medium	....	Slight	....	....
H.5	12 E	Yellow	Good	Med	....	....	Slight	....	....	....	....	....
	W	Yellow	Poor	Poor	....	....	....	V. Slight	....	V Bad *	....	....
H.7	12 W	Drab	Poor	Poor	Fair	....	....	Consid.	....	V. Badly	Consid.	....
	E	Drab	Good	Good	Good	....	Slight	Medium	....	V. Slight	....	....
H.1	13 E	Drab	Med	Med	....	....	Consid.	Medium	....	Consid.	Slight	....
	W	Drab	Good	Fair	Good	....	....	....	....	Slight †	....	....
H.7	16 S	Drab	Good	Good	Good	....	Consid.	Consid.	....	Slight	....	....
H.11	120 E	White	Good	Good	Good	Good	....	....	....	....	....	....
H.11	126 E	White	Good	Good	Good	Good	....	....	....	....	....	....

* Not entirely due to hail.

† Protected.

Section and Panel No.	FormulaNo.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
19e	13	White	Fair	Fair	Good	Good	Consid.	....	....	Consid.	....	V. Slight
H.9	13 S	Drab	Good	Med	.....	.....	....	....	....	V. Slight	....	Peels
	N	Drab	Med	Poor	(some portions very poor).......				....	Slight	Slight	Slight *
H.12	13 N	White	Fair	Med	Good	Good	Consid.	....	....	Medium	V. Slight	Slight
	S	White	Fair	Fair	Good	Good	Consid.	Consid.	....	Consid.	....	....
H.6	15 N	Yellow	Fair	Fair	Good	Good	Slight	....	....	Med(hail)	....	....
	S	Yellow	Good	Good	Good	Good	(protected by porch)		....	....	....	....
H.9	15 S	Drab	Med	Med	.....	.....	....	Slight	....	Consid.	....	Cons. †
	N	Drab	Good	Good	.....	.....	....	....	....	....	....	....
H.12	15 W	White	Med	Med	Fair	Fair	....	....	....	Consid.	....	....
	E	White	Fair	Good	Good	Good	....	....	....	Medium	....	....
H.11	132 N	White	Poor	Poor	Med	Med	Slight	....	....	Badly	Badly	Consid.
	S	White	Good	Good	Good	Good	Slight	Slight	....	Consid.	Slight	Slight
7e	7'06	White	Poor	V P	Fair	Fair	Slight	Consid.	....	Badly	Badly	....
21e	14	White	Poor	Poor	Good	Med	Medium	....	....	V. Badly	....	Consid.
36e	24	White	Med	Poor	Good	Fair	Medium	....	....	Badly	....	Consid.
37e	25	White	V P	Poor	Good	Med	Medium	....	....	V. Badly	....	V. Badly
39e	26	White	V P	Poor	Good	Med	Medium	....	....	Badly	....	Badly
41e	17	White	Med	Med	Good	Fair	Medium	....	....	Badly	....	....
75f	125	Grey	Poor	Poor	Fair	.....	Medium	....	....	V. Badly	....	Slight

* Paint coat very brittle.

† Considerable under edge of clap boards.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
H.6	3 N	Yellow	Fair	Fair	Good	Good	....	....	....	Medium	....	
	S	Yellow	Good	Good	Good	Good	(protected by porch)					
H.8	3 W	Drab	Poor	Poor	Med	.....	....	Slight	....	V. Badly	Consid.	Badly
	E	Drab	Poor	Poor*	.....	.....	Slight	....	....	Slight	(Repainted in spots)	
H.13	13 N	Drab	Fair	Poor	.....	.....	....	....	....	Con(hail)	....	....
H.13	3 W	Drab	Fair	Med	.....	.....	Consid.	....	....	Consid.	Slight	....
H.5	14 N	Yellow	Med	Med	.....	.....	Slight	....	....	Medium	....	....
	S	Yellow	Good	Good	.....	.....	....	....	....	....	....	....
H.7	14 W	Drab	Poor	Poor	Fair	.....	....	Consid.	....	V. Badly	Consid.	Slight
	E	Drab	Good	Good	Good	.....	Slight	Medium	....	V. Slight	....	....
H.12	14 W	White	Med	Med	Fair	Fair	....	....	....	Consid.	....	....
	E	White	Good	Good	Good	Good	....	....	....	....	....	....

* Due to bad spots.

GROUP V. This group includes paints in which the vehicle is subject to changes.
GROUP V. a. Unusual proportions of turpentine.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
16e	11	White	Poor	Poor	Good	Med	Slight	....	....	Badly	....	Badly
68b	109	White	Med	Fair	Good	Good	Medium	Consid.	....	Badly	Slight	....
d	....	White	Fair	Fair	Good	Good	Medium	Consid.	....	Badly	Slight	....
f	....	White	Fair	Fair	Good	Good	Medium	Consid.	....	Consid.	....	....
h	....	White	Fair	Fair	Good	Good	Medium	Consid.	....	Consid.	....	....

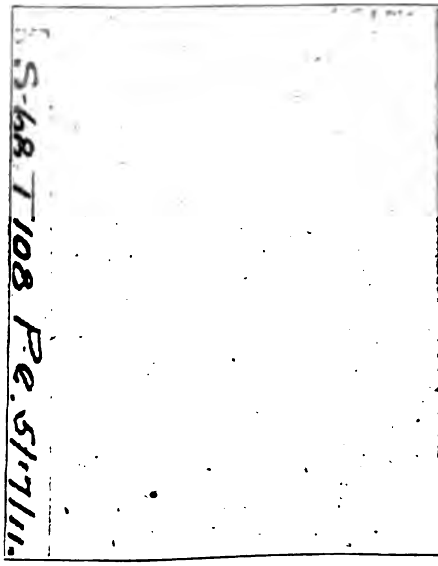

Fig. 29. Corroded White Lead, Zinc Oxide; Normal Turpentine Content.

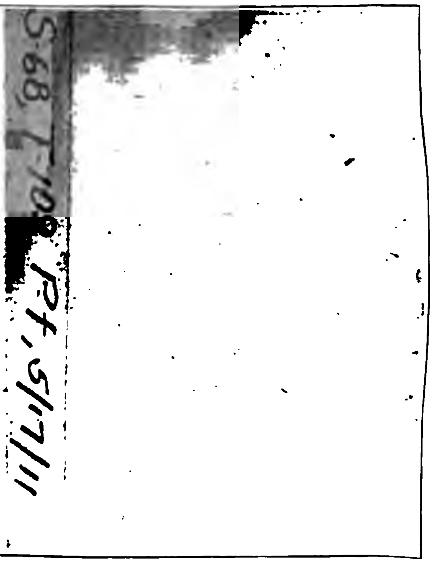

Fig. 30. Same as Fig. 29. High content Turpentine.

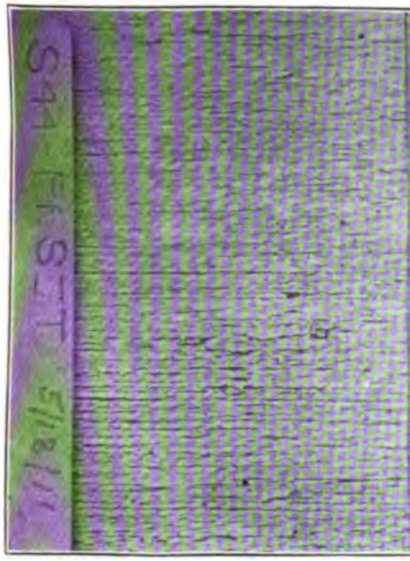

Fig. 31. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 10% Benzine.

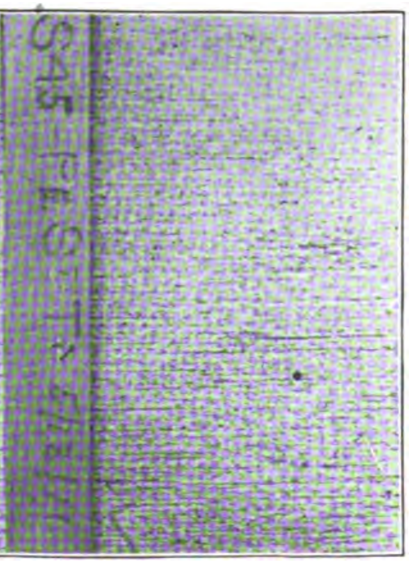

Fig. 32. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 25% Benzine.

GROUP V. b.

Differing percentages of benzine.

A fairly complete set of these tests was started in fall of 1910; but owing to bad weather only two coats of paint could be applied at the time. These tests will be completed and additional ones made, reports being given at later date.

The tests, influenced by benzine, that have progressed far enough to be of interest, are as follows:

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
9–06	See Group V c.											
10–06	See Group V c.											
11–06–13	See Group V.c.											
6e	4	White	V P	Poor	Good	Poor	Slight	....	....	V Badly	Badly	....
13	9	See Group V c.										
19e	13	White	Fair	Fair	Good	Good	Consid.	....	....	Consid.	....	V. Slight
21e	14	White	Poor	Poor	Good	Med	Medium	....	....	V. Badly	....	Consid.
41e	17	White	Med	Med	Good	Fair	Medium	....	....	Badly	....	....
44f	SII, T1	White	Med	Poor	Good	Poor	Medium	....	....	Badly	Slight	....
44g	SII, T2	White	Fair	Fair	Good	Med	Medium	Consid.	....	Consid.	....	....
44h	SII, T3	White	Poor	Poor	Good	Med	Medium	....	....	Badly	Badly	....
45e	SII, T4	White	Med	Med	Good	Poor	Consid.	Consid.	....	Badly	....	....
79	133	See Group V c.										

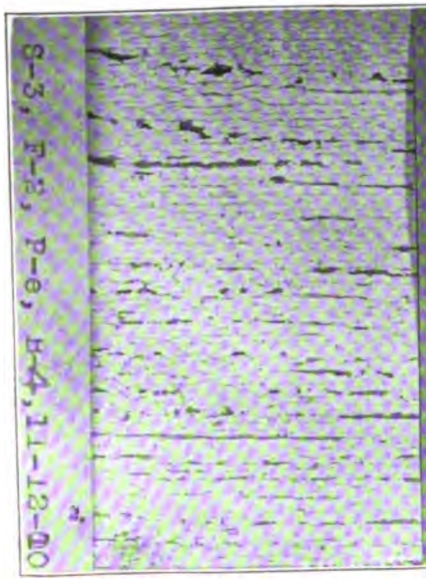

Fig. 33. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains 4% water; 3 years' exposure.

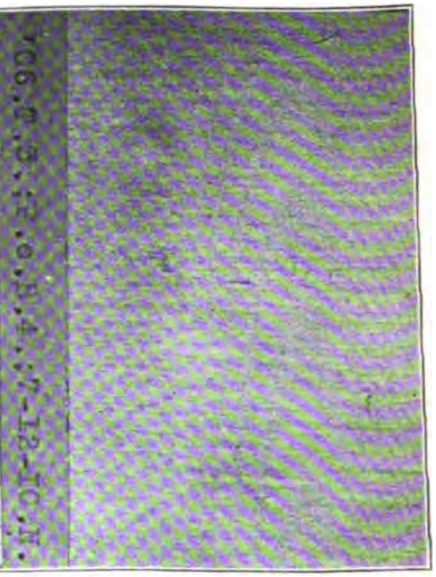

Fig. 34. Corroded White Lead 50, Zinc Oxide 50; Vehicle contains no water; 4 years exposure

GROUP V. c.

Water as a constituent of paint vehicle.

The demonstration of the acknowledged deleterious effect of water as a paint constituent is attended with some difficulty, as in our tests the paints containing large amounts of water are of a formula generally accepted as not of the highest type.

However, the examples selected for illustration show in a degree the ill effects of water.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligator-ing	Cracking	Flaking	Scaling
9–06f	9	Grey	Poor	Poor	Good	.....	Slight	....	....	Badly	Badly	....
9–06e	10	White	Poor	Poor	Fair	Med	Slight	....	....	Badly	Badly	....
11–06e	13	White	Entirely disintegrated.									
3e	2	White	V P	Poor	Good	Poor	Slight	....	....	V Badly	Badly	Slight
10e	7	White	Poor	Poor	Good	Med	....	....	....	Badly	....	Consid.
13e	9	White	Med	Poor	Good	Med	....	....	....	Badly	....	Consid.
18e	12	White	V P	Poor	Good	Med	Slight	Medium	....	Badly	....	Badly
22e	15	White	Med	Poor	Good	Fair	Medium	....	....	Badly	....	Slight
39e	26	White	V P	Poor	Good	Med	Medium	....	....	V. Badly	....	Badly
75f	125	Grey	Poor	Poor	Fair	.....	Medium	....	....	V. Badly	....	Slight
79f	133	L Fawn	Poor	Poor	Good	.....	Medium	....	....	Badly	Slight	....

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GROUP VI.

There is left a final group made up of tests in which the paint coats are of different composition.

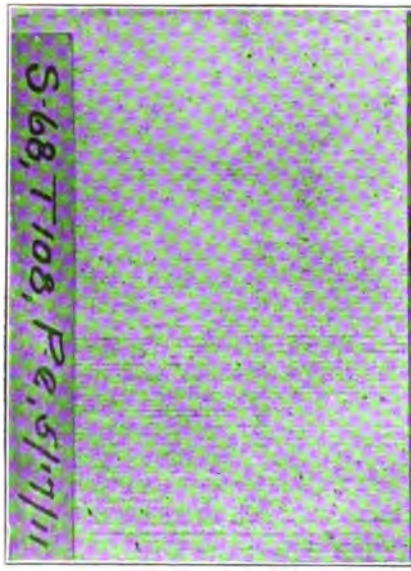

Fig. 35. First Coat, Corroded White Lead. Second and third Corroded White Lead 75, Zinc Oxide 25. Soft Pine.

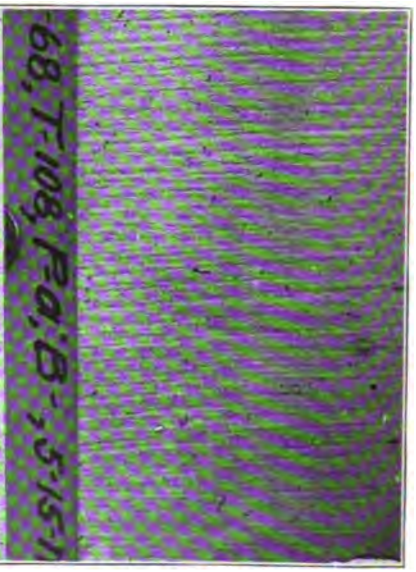

Fig. 36. Same as Fig. 35. Hard Pine.

See also illustrations under heading "Effect of Tint."

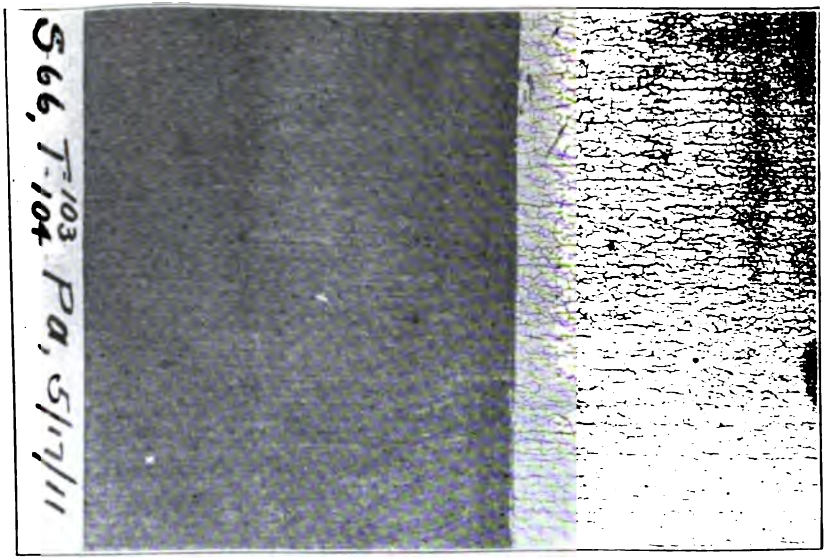

Fig. 37. Two coats Corroded Lead 75, Zinc Oxide 25, over prime coat of Yellow Ochre. Tinted yellow.

Fig. 38. Same as Fig. 37; White.

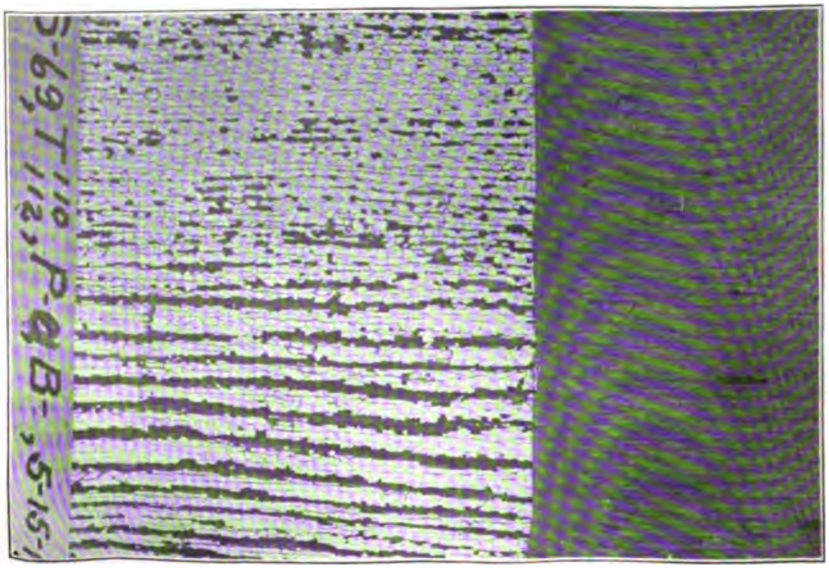

Fig. 39. Two coats Corroded White Lead over Orange Shellac Primer; color White; Hard Pine.

Fig. 40. Same as Fig. 39; tinted yellow.

Section and Panel No.	Formula No.	Color	General Condition	Cond. for Repainting	Covering	Color Quality	Chalking	Checking	Alligatoring	Cracking	Flaking	Scaling
46f	S IV T1	White	Fair	Fair	Fair	Med	Medium	Consid.	....	Consid.	....	....
46g	S IV T2	White	Fair	Fair	Fair	Med	Medium	....	....	Consid.	....	....
46h	S IV T3	White	Med	Med	Good	Med	Consid.	....	....	Badly	Slight	....
66e	102	White	Fair	Med	Fair	Med	Consid.	Badly	....	....	....	....
66f	103	White	Poor	Med	Med	Poor	Medium	V. Badly	Badly	....	....	....
66e	104	Yellow	Good	Good	Good	Good	V. Slight	Slight	....	....	....	....
66f	105	Drab	Good	Good	Good	Good	V. Slight	Slight	....	....	....	....
68e	108	White	Good	Fair	Good	Good	Consid.	Badly	....	Consid.	....	....
68f	109	White	Fair	Fair	Good	Good	Medium	Consid.	....	Consid.	....	....
69e	110	White	Poor	Poor	Med	Fair	Consid.	Badly	....	Badly	Slight	....
69f	111	White	Poor	Poor	Med	Poor	Medium	....	....	Badly	Badly	Consid.
69e	112	Yellow	V G	Good	Good	Good	V. Slight	Slight	....	....	....	....
69f	113	Drab	V G	Good	Good	Good	V. Slight	Slight	....	....	....	....

Without making any attempt to explain the cause of the well known fact, we insert a few illustrations showing the wonderful effect of tint in retarding the disintegration of a paint film.

An examination of the data published in previous bulletins, as well as that under the various groups in this one, will show that with practically no exceptions, tinted paints have a much longer life than white paints under the same conditions of exposure.

It will be noted throughout this report, that fence tests show themselves to be examples of accelerated disintegration of different paint films. This is true with very few exceptions. The instances in which conditions are not comparative being due to some influence exerted on house tests, which did not effect fence tests. An example of this shows up in House Test 9, Formula 13, where paint was put on over old paint, which, although apparently alright at the time, has caused a brittleness of whole film and started a disintegration which cannot help but be extensive within a short time.

Again, in House Test 12, White Lead, there appears to have been damp lumber under cornice and window sills at time of painting, so that now there are some pronounced examples of flaking and peeling.

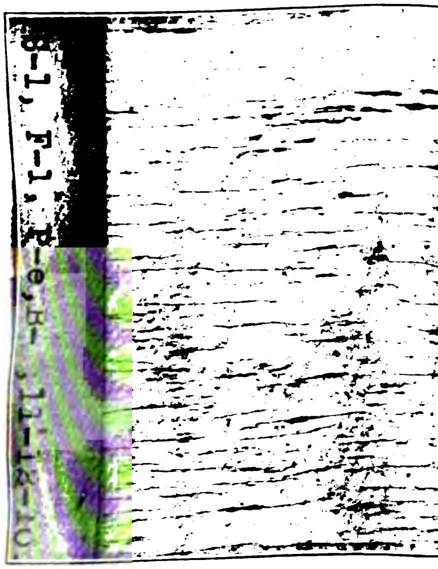

Fig. 41. Corroded White Lead *30,* Zinc Oxide 70; 3 years' exposure on Fence.

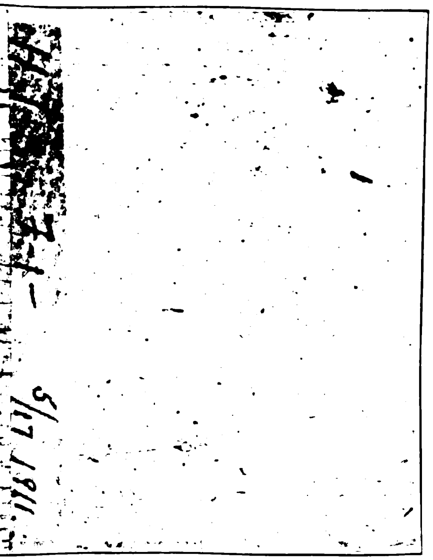

Fig. 42. Same as 41; 3½ years' exposure on House.

NOTES ON PREPARED PAINTS FOR METAL SURFACES

BY

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The Institute of Industrial Research, Inc., Washington, D. C.

Presented at the Forty-sixth Annual Convention of the
International Association of Master Car and Locomotive Painters
of United States and Canada
Detroit, Michigan, September, 1915.

PREFACE

The many requests that have come to the writer for information on paints for metal have prompted the following article, which discusses briefly the composition, properties, and durability of various pigments and materials used in the manufacture of such paints. The writer's first announcement of the inauguration of seacoast metal paint tests was made before the fortieth convention of this Association. It is fitting, therefore, that the knowledge gained from these tests and applied in practice by the grinder and user should be presented at this time.

H. A. GARDNER.

NOTES ON PREPARED PAINTS FOR METAL SURFACES

By Henry A. Gardner

In designing protective coatings for metal the modern practice has been to apply the results available from researches into the cause of corrosion. These results have shown that materials of a basic nature or substances which contain soluble chromates prevent the rusting of iron. For this reason pigments of a basic nature or pigments containing the chromate radical have come into wide use in the manufacture of protective paints. That they are the best pigments for this purpose has been proved not only in practice, but also in the Atlantic City tests,* which were made upon a series of three hundred large steel panels, using nearly one hundred different pigment paints. Applying the results of these tests to the practical manufacture of protective coatings, the writer will discuss the use of the various pigments under separate headings, taking up the composition of the most widely used colors for metal painting, namely, red, gray, black, and green. Most of the paints outlined herewith are suitable for the painting of structural steel, bridges, steel railroad cars and equipment, ornamental ironwork, poles, posts, and for general work on metal surfaces.

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*As a final summing up of these most authoritative tests to determine the value of different pigments in protecting metal, the following chart is presented. This shows the pigment paints which rated highest at the various annual inspections.

This chart does not show pigments which were not included in the ten highest classes. For full description of tests and further information see Proc. Amer. Soc. for Test. Mater., Vol. IX, 1909, pp. 203 and 204; Vol. X, 1910, pp. 79-86; Vol. XI, 1911, pp. 192-194; Vol. XIII, 1913, pp. 369-371; Vol. XIV, 1914, pp. 259 and 260.

Pigment Paints of Ten Highest Average Ratings, 1910-1914

	1910	1911	1912	1913	1914
Basic chromate of lead	9.1	10.0	9.9	9.8	7.5
Sublimed blue lead	9.6	8.8	9.0	7.2	6.0
Carbon black and barytes	....	....	....	6.8	5.0
Chrome green	9.8	9.8	8.6	7.6	5.0
Willow charcoal	....	8.8	8.6	7.9	4.5
Red lead	....	....	8.1	....	4.0
Natural graphite, containing clay, etc.	....	....	....	....	4.0
Zinc chromate	9.4	9.5	8.8	8.0	4.0
Zinc-and-lead chromate	9.5	9.7	9.2	8.3	4.0
Magnetic black oxide	9.5	9.5	8.6	7.8	4.0
Zinc-and-barium chromate	9.7	9.5	8.5	7.8	....
Sublimed white lead	9.5	9.0	8.1	....	....
Bright red oxide	9.3	....	....	....	....
Prussian blue (water stim.)	9.2	....	....	6.7	....
Prussian blue (water inhib.)	....	8.5	....	....	....

Red Lead Priming Paints.—Red lead may be purchased in the market ground to a heavy paste in linseed oil, ready to thin with oil for use. Such red lead is usually produced by the thorough oxidation or overburning of lead, the dry pigment generally containing approximately 98% of lead tetroxide. This pigment, being practically free from litharge, does not react to any great extent upon the linseed oil in which it is ground, and therefore remains soft for a considerable period of time. It is well understood, however, that one of the most valuable properties of red lead is its ability to set up to a hard, elastic film that shuts out moisture and gases which are apt to cause corrosion. This cementing action is due to the presence of unburnt litharge, a pigment which rapidly reacts upon linseed oil to form a lead linoleate compound. It will readily be seen, therefore, that red lead free from litharge has no cementing action and should not be considered more protective than iron oxide or any other similar neutral pigment. It is thoroughly essential that red lead should be highly basic and should contain a considerable percentage of litharge, if the red lead is to protect iron from corrosion. Although such red lead is often purchased in the dry form and mixed with linseed oil on the job at the time of application, it is a growing custom to use prepared red-lead paints made from finely divided red lead ground to a fluid condition in linseed oil. Such paints remain in excellent condition for a long period of time. They have a high protective value and are well suited for general purposes. They are used extensively for priming steel vessels. The Navy Department has found that inert pigments, such as silica and asbestine, give good results when used in ready mixed red-lead paints, their action being to prevent settling of the red lead upon storage.

A specification which may be used by the grinder when purchasing dry red lead for the manufacture of prepared paints is given herewith:

Specification.

1. The dry pigment to be of the best quality, free from all adulterants, and to contain not less than 85% nor more than 90% Pb_3O_4, the remainder being practically pure lead monoxide (PbO).

2. It shall contain not more than 0.1% of metallic lead nor more than 0.1% of alkali figured as Na_2O.

3. It shall be of such fineness that not more than 0.5% remains after washing with water through a No. 21 silk bolting-cloth sieve.

NOTE.—If desired, the gram weight of the red lead may be specified. Extremely light, fluffy red lead should run from 10 to 13 grams per cubic inch. Medium red lead will run from 13 to 16 grams per cubic inch. Heavy red lead will run from 17 to 19 grams per cubic inch.

Composition of Red-Lead Priming Paints.—The cost of red-lead paints is a subject of vital importance to the large user. Red lead may be produced in different physical states. Ordinarily the grade that has been overburned is extremely heavy, one cubic inch weighing from 18 to 20 grams. For the production of a paint from such red lead, according to the formula used by one large consumer, the following quantities would be required:

Red lead	26 lbs.
Linseed oil	26 gills
Petroleum spirits	3 "
Drier	3 "

This would produce approximately 1 2/5 gals. of paint. Each gallon would contain about 20 lbs. of red lead, the actual cost of the red lead itself being in the neighborhood of $1.60. A red lead of a much better protective value, containing from 10 to 12% of free litharge and produced in an extremely fine physical state of comminution, so that one cubic inch would not weigh over 12 to 15 grams, would produce a paint of exactly the same body on the following formula:

Red lead	20 lbs.
Raw linseed oil	26 gills
Turpentine	3 "
Drier	3 "

This would produce approximately 1 1/3 gals. of paint, each gallon of which would contain about 15 lbs. of red lead, the actual cost of the dry pigment per gallon being in the neighborhood of $1.20. Red lead of still lighter gram weight could be used, so that a still smaller quantity of pigment would be required per gallon of oil. The durability of such paints should compare favorably with those containing very high percentages of red lead of high gram weight. Pigments of an extremely light nature, such as lampblack, grind in very large quantities of oil, yet their films are more elastic and durable than many paints which are composed of much pigment and little oil.

Red Paints.—Iron oxide has always been one of the most widely used pigments for the manufacture of protective coatings. Oxides that are free from acid or soluble substances give the best results. There are many grades, from the brilliant Indian reds, containing 98%, down to the natural mined brown shale oxides, containing from 30 to 60% of ferric oxide, the balance being silica, clay, etc. Venetian reds, consisting of about equal parts of ferric oxide and calcium sulphate, are also quite widely used. It is customary to add to iron oxides from 10 to 20% of zinc chromate, zinc oxide, or red lead, in order to make them rust inhibitive. Such red paints are widely used for application to tin roofs, metal siding, and general structural steel. Red paints made from basic lead chromate (American Vermilion), the pigment which gave the best results in the Atlantic City tests, would doubtless be the most economical in the long run, but the high cost will probably prevent their use to any great extent. The use of a percentage of basic chromate of lead in iron-oxide paints is to be approved.

Gray Paints.—Mixtures of white lead (basic carbonate or basic sulphate) and zinc oxide, tinted gray with carbon black, are widely used for this purpose and give excellent results in every climate.

A valuable rust-inhibitive coating for general priming or finishing work may be prepared from sublimed blue lead. The use of two parts of blue lead and one part of linseed oil containing about 5% of turpentine drier makes a paint of the right consistency. This may be purchased in prepared form. When this paint is used for top-coat work in marine exposures (battleship gray), the addition of 1% of carbon black to the blue lead aids in the maintenance of the color. The rust-inhibitive value of this pigment is due to the high percentage of lead oxide (litharge). This pigment, however, is so combined with the lead sulphate that it does not have any great hardening action upon the linseed oil and stays in an excellent condition in paste form for a long period of time without hardening. When purchased ground to a paste in 10 parts of oil, there should be added approximately 5 gallons of linseed oil and one pint of drier for use. A specification for the purchase of blue lead for use in metallic paints is given herewith:

	Minimum.	Maximum.
Lead sulphate..........	44%	52%
" oxide..............	33%	40%
" sulphide...........		0.5%
" sulphite............		3.5%
Zinc oxide..............		3.0%

Black Paints.—Black paints are often preferred for the finishing coat on steelwork, carbonaceous paints being unsuited for application direct to the metal on account of their rust-stimulative action. Carbon pigments, such as gas carbon black, oil black, artificial and natural graphite (flake and amorphous) are usually the base pigments used in black paints. Silica and other earth pigments may be combined with the carbon. The slow-drying nature of such paints is lessened by the addition of litharge. The use of boiled linseed oil as a vehicle is advisable.

Magnetic black oxide of iron (precipitated) forms an excellent black protective paint when ground in linseed oil. The slightly basic character of this pigment accounts for its inhibitive value. The natural variety of black magnetic oxide of iron is also suitable for this purpose, but should be tested for freedom from soluble acid impurities before use. Willow charcoal is not made in commercial quantity; its use, therefore, will be restricted. Its inhibitive value depends upon the basic nature of the impurities present.

Green Paints.—Mixtures of zinc chromate and Prussian blue in oil are highly inhibitive and have proved satisfactory in long service tests. Chrome yellow tinted with black oxide of iron to an olive shade is very permanent and protective. Chrome green made from lead chromate and Prussian blue is generally used when precipitated upon a barytes base.

Marine Paints.—Steel vessels traversing bodies of salt water are rapidly acted upon, corrosion and incrustation by marine growths being shown. The bottoms of boats are usually protected by applying over the red-lead priming paint a coat of anti-corrosive paint containing iron and zinc pigments ground in a shellac-alcohol vehicle. There is subsequently applied a coat of anti-fouling paint, usually made of iron oxide, zinc oxide, and metallic zinc powder, admixed with a poisonous compound such as red oxide of mercury or bichloride of mercury. The upper portions of vessels are usually painted with a linseed-oil paint, the standard slate color of the Navy Department consisting of a mixture of white lead and zinc oxide tinted gray and ground in linseed oil. This is, of course, applied over a prime coating of prepared red lead. The boot topping or water-line paint is generally of a bituminous nature, the exposure at this point being extremely severe. Chinese wood-oil varnish improves the bitumen base.

Bituminous Paints.—Bituminous coatings have a wide use for special purposes. They are often made by blending refined coal-tar pitch, asphalt, linseed oil, and oleo-resinous varnishes, subsequently thinning down with turpentine or light mineral thinner. During recent years a heavy-bodied blown petroleum residual pitch has come into wide use in the manufacture of waterproofing bituminous paints. This pitch usually has a high melting point (150° C.). It is soluble in turpentine, benzol, and some mineral distillates. When in solution it may be admixed with oils for the production of rapid-drying elastic paints. The pitch has high resistance to acids and is not acted upon by the sun to the extent that coal tar is.

When coal tar is used in the manufacture of paints, it should be refined. Ammonia and water in the tar are the active causes of saponification or non-adherence to metal. The presence of large quantities of free carbon or naphthalene in the tar will cause disintegration and checking. For refining, the crude tar may be heated to approximately 115° C., holding it at that temperature until the water is evaporated. From 5 to 10% of lime may be stirred in, in order to neutralize the free acids. The tar may then be thinned with benzol or mineral spirits. If a rapid-drying paint is desired, a quantity of resinous varnish may be added. The addition of Chinese wood oil and asbestine in a coal-tar paint made along the above lines will aid in producing a film that is not so subject to alligatoring when exposed to the sun.

Bituminous paints of the above composition are used as coatings upon pipe-lines in acid factories, tanks containing dilute acids, metal submerged in water, and for other similar work. For such purposes it is generally advisable to first coat the metal with a thoroughly hard drying prime coating made by adding 2 lbs. of litharge to a prepared red lead or other rust-inhibitive paint. The bituminous paint may then be applied. Steel mine timbers subjected to sulphur water and gas, reservoir tanks containing water, submerged lock gates, tunnel metal, etc., may be efficiently preserved from corrosion by this method.

Painting Galvanized Iron.—Roofing, siding, railing, drain pipes, cornice work, etc., constructed of galvanized iron require painting if they are to be kept in a good state of preservation. Paints are apt to peel from galvanized iron on account of the smooth, spangled surface. This condition, however, is obviated by first treating the metal before painting with a solution of copper salts. Such a solution may be prepared by dissolving 4 oz. of copper acetate, copper chloride, or copper sulphate in one gallon of water. By brushing on this solution the galvanized iron is roughened, a thin deposit of copper being plated out over the surface. After an hour or so, the surface may be lightly brushed and then painted with a thoroughly inhibitive oil paint. Firmly adhering films are thus produced.*

Painting Tinned Surfaces.—Tin plate, such as is used for roofing and siding, will rapidly corrode unless protected by paint. The pin-holes present in the tin coating on the steel base metal act as pockets to catch moisture, which causes rust spots and pit-holes. Before applying paint to the sheets it is advisable to rub the surface of the tin with a cotton rag saturated with benzine or turpentine. This will remove the palm oil that is present upon the surface and allow the paint to firmly adhere. Iron-oxide paints containing an inhibitive pigment are widely used for preserving tin. The use of 15 to 20% of zinc oxide, red lead, or zinc chromate with a neutral bright iron oxide produces an excellent paint. The partial use of boiled linseed oil or kauri gum mixing varnish will add to the gloss and water resistance. Such paints are also suited for use on metal shingles and pressed-steel siding—plain black, galvanized, or tinned. For dipping purposes, turpentine or high boiling point mineral spirits should be used for thinning. Cheap driers containing a low boiling point benzine should be avoided.

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* The writer has recently experimented with solutions of metallic salts of arsenic, antimony, tin, lead, mercury, cobalt, iron, and manganese to replace copper solutions for the above purpose. Arsenic and tin were most satisfactory, but not as economical or desirable as copper.

The ABC of Home Painting

[illegible]

THE SHERWIN-WILLIAMS CO.

PAINT AND VARNISH MAKERS

FACTORIES: CLEVELAND, CHICAGO, NEWARK, MONTREAL, LONDON, ENG.
SALES OFFICES AND WAREHOUSES IN PRINCIPAL CITIES

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THE SHERWIN-WILLIAMS CO.

A Real Guide-Book To Home Up-Keep

THE painting instructions set forth in this book have been prepared by a practical painter who is able to write in the language of the home-owner. Most books on painting are so full of the terms of the trade that nobody but a painter can understand them. There is not a single technical word or phrase used in these instructions. Any one can understand them and follow them.

The Sherwin-Williams Co. makes a complete line of Home Finishes—a paint, stain, enamel or varnish for every surface in and around the home. Each comes all ready to apply and in such sizes of cans that you need buy only the quantity you need for your purpose.

The more important painting work around a home should be done by an experienced painter, but the little jobs can be done by any one. Just get the right Sherwin-Williams Product for the surface to be refinished and follow the instructions here set forth.

What do you wish to Paint?

To assist the home-owner in readily finding the particular S-W Product required for the surface to be painted, varnished, stained or enameled, the different surfaces are listed first, in alphabetical order.

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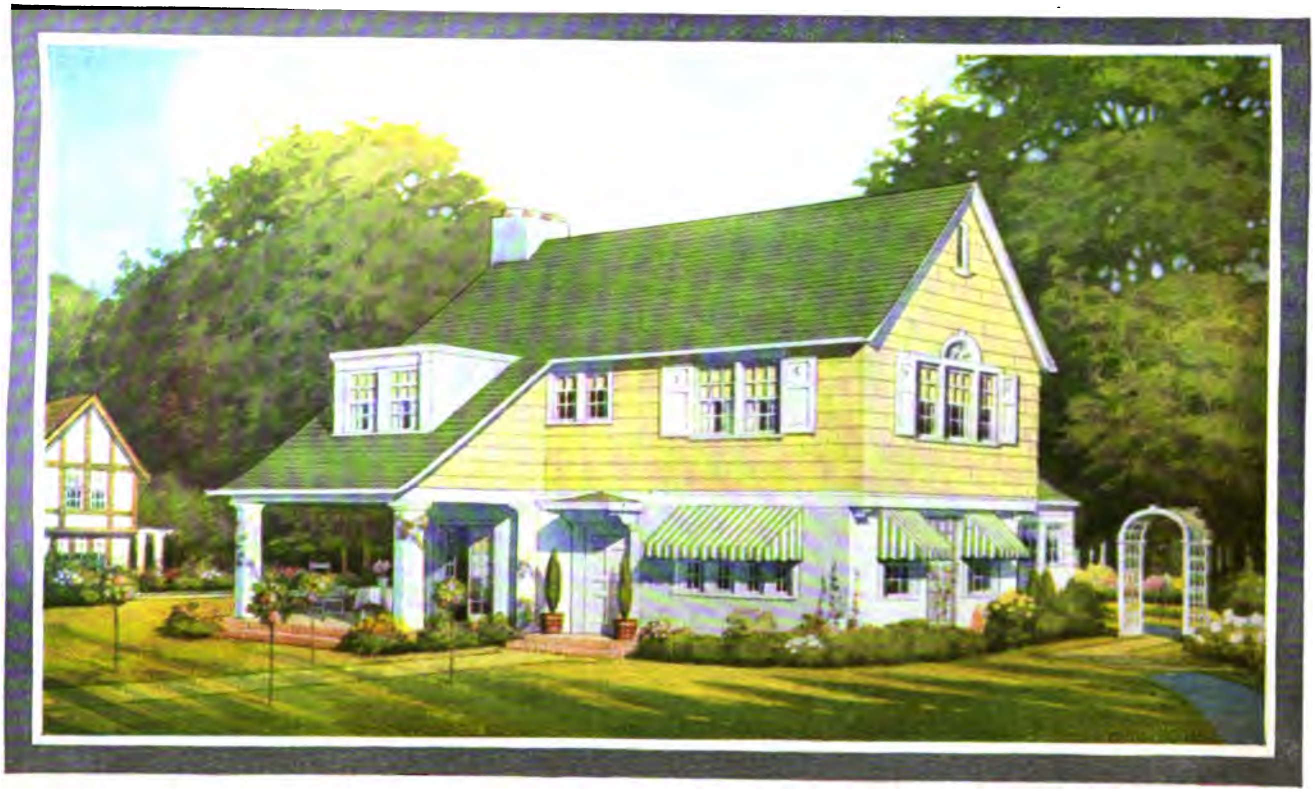


A Pleasing Color-Scheme for Suburban Dwelling

(See Page 46 for Specifications)

A Word of Caution

THE instructions set forth in this book are based upon the use of Sherwin-Williams Products exclusively. As the paints, varnishes and other finishes of various manufacturers differ in many ways, it is essential that Sherwin-Williams Products be used, and used exactly as specified, if the most satisfactory results are to be secured. There are 25,000 dealers selling Sherwin-Williams goods, but if you can not secure them conveniently, write us and we will see that you are supplied.

Exterior Work

(*a*) **Preparing Surfaces**—On new exterior work to be painted, apply S-W Orange Shellac with a brush over all knots and sappy places. On old work, first remove all loose paint, using a scraper or steel brush, S-W Taxite (a liquid paint and varnish remover), or a painter's torch. Putty all nail-holes after the priming coat (see page 11-*a*).

(*b*) **How to Apply Paint**—Exterior paint should be applied with the brush not full of paint, and should be rubbed on to the surface well, by using a stroke from left to right and back again, or by using the brush in a rotary or circular movement.

(*c*) **Brushes**—For painting exterior siding, use a 4-inch bristle brush. For exterior trimming the same kind of brush in 3-inch width will be most convenient to use. For the window-sash, a 1½-inch brush of the same character is recommended.

For carriage and auto work, use a bear-hair or badger-hair brush to apply the varnish.

Exterior Estimating

(*d*) By following these directions the reader should be enabled to obtain a very close estimate of the quantity of material necessary for exterior painting. This method, however, is for general work, and the result will be fairly accurate. No set method of estimating can be correct in every detail, as allowances must be made for a varying number of bays, gables and other projections, and for the difference in absorption of the various building materials.

Frame, brick and concrete buildings are all figured alike, with the exception, of course, that a different paint is applied on concrete or brick structures than on those of wood construction. On frame buildings, SWP, Creosote Paint or Mine, Mill and Factory Colors are most generally used. On concrete, cement, brick and composition building material of like nature, Concrete Finish should be used.

To ascertain the number of gallons for body of building, measure the distance around the building and multiply by the average height. This will give the number of square feet to be painted. Divide this by 360 (number of square feet to the gallon SWP covers in two coats) and the result will approximate the number of gallons of SWP needed for the job. Then one-sixth of this quantity will represent the amount needed for cornices, trimming, etc. The same amount should be allowed for the sash.

An average of 40 square feet has been established for one pair of blinds. If the number of blinds is multiplied by 40 and the result divided by 360, this will give the number of gallons needed for all blinds.

Exterior Work

If the porch ceiling is to be painted with SWP, multiply its length by its width, which will give its area. Divide this by 360 for the number of gallons needed for that surface. If to be finished natural, estimate the number of gallons of Rexpar Varnish needed for two coats, divide area by 150 (covering capacity of Rexpar, two coats).

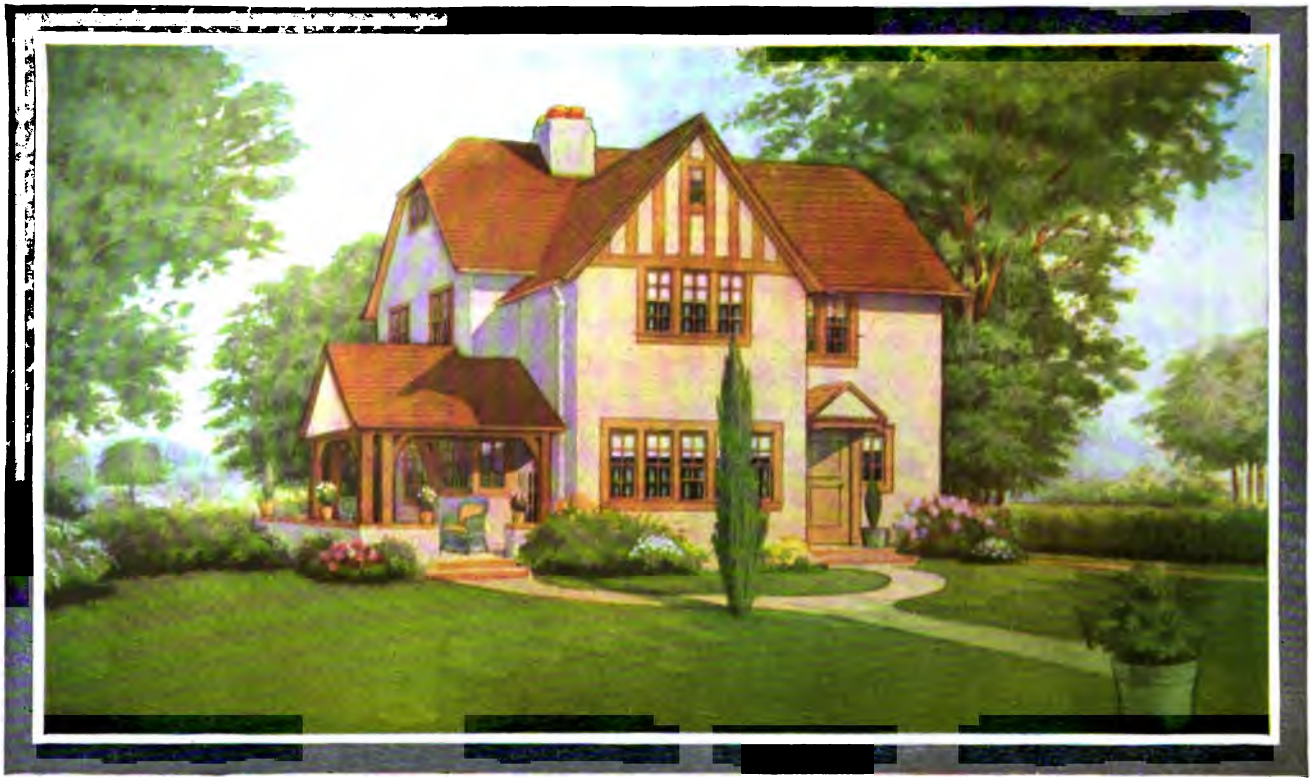
Exterior doors of average size which are to be painted require about one pint of SWP. Doors of oak or other open-grained wood to be stained and varnished will require about one-half pint of stain, one pound of Paste Filler and one pint of Rexpar each. Pine or close-grained doors to be stained and varnished, require about one-half pint of stain and one pint of Rexpar each.

Shingled roofs to be stained with S-W Preservative Shingle Stain, are usually treated with two coats—one dip coat and one brush coat. To determine the quantity, multiply the length of the house by its width and add one-third that amount which will give the approximate area of the roof. Divide this by 55 (covering capacity in square feet of Preservative Shingle Stain, two coats to the gallon) and the result will give the number of gallons necessary.

Exterior Surfaces and How to Treat Them

(*a*) **NEW LUMBER**—SWP, a prepared paint made in a wide range of colors should be used to paint exterior woodwork, such as siding, trimming, sash, etc., using three coats. The paint should be thinned for use with pure raw linseed oil and pure spirits turpentine, as follows: For white pine, poplar, spruce, fir, gum (selected), redwood, California cedar and white cedar, use as first coat SWP in color selected, thinned with one gallon pure raw linseed oil and a pint of pure spirits turpentine to each gallon of paint; for second coat use SWP thinned with one pint pure spirits turpentine to each gallon of paint; for third or last coat, apply the paint just as it comes from the can (except very dark colors, in which case less oil and more turpentine should be used in the priming coat). For hemlock, cypress, Washington cedar, red cedar, hard pine (Georgia, Norway and Southern), use as first coat, SWP in color selected, thinned with one-half gallon linseed oil and one gallon pure spirits turpentine to each gallon of paint; as second coat, use one-quarter gallon pure spirits turpentine to each gallon of paint; for third coat, apply paint as it comes from the can.

(*b*) **OLD LUMBER**—In painting old exterior woodwork, see that all loose paint is removed and that the surface is free from grease, soot, etc. Apply two coats of SWP, brushing out each coat well and allowing 24 to 36 hours between coats for thorough drying. If any thinning is required, use only pure raw linseed oil and turpentine. On old wood about one-quarter gallon pure spirits turpentine and one-quarter



A Good Color Combination for Concrete House

(See Page 46 for Specifications)

gallon pure raw linseed oil must be used to each gallon of paint in reducing the first coat to a thin consistency, to insure proper penetration of the surface and thorough drying of the new coat of paint.

(*a*) **Porch Floors—To Paint**—For new porch floors, use three coats of S-W Porch and Deck Paint. The first coat should be thinned for use with about one quart of pure raw linseed oil and one quart of pure spirits turpentine to each gallon of paint. Apply second and third coats as paint comes from can. For old floors previously painted, two coats of this paint will be sufficient. To treat canvas used on floors of sleeping porches, thin the first coat with one-half gallon of pure raw linseed oil to every gallon of paint and omit the turpentine. The second and third coats should be applied as the paint comes from the can.

(*b*) **Doors—Exterior—To Stain and Varnish**—Apply a coat of S-W Golden Oak Stain or S-W Oil Stain (allow the oil stain to remain on the wood about ten to twenty minutes or until it penetrates the wood and wipe off surplus stain with a soft cloth). After allowing about 24 hours for thorough drying, the wood, if open-grained as is oak, chestnut, ash and similar varieties, should be treated with S-W Paste Filler in shade selected. The Filler should be thinned to the consistency of thick cream and applied with a coarse brush, wiping off the surplus Filler across the grain with burlap or excelsior, allowing only so much of the Filler to remain as has entered the pores of the wood and is intended to remain there. When allowed to set about 24 hours, the surface should be lightly rubbed with 00 sandpaper. Finish this surface with two coats of S-W Rexpar Varnish, allowing about 36 hours between coats for thorough drying and sandpapering the first varnish coat to a perfectly smooth surface with 00 sandpaper. If a dull surface is desired, rub the last coat with pumice-stone and oil after the varnish has thoroughly hardened. *Doors of close-grained wood*, such as pine, cypress, etc., should be treated in the same way, but the Paste Filler should not be used.

(*c*) **Doors—Exterior—To Mahoganize Doors of Birch, Maple or Mahogany**—First apply a coat of S-W Permanent Mahogany Stain No. 700 (made in Light Mahogany, Dark Mahogany and Brown or Antique Mahogany). After this is allowed to dry overnight the wood should be sandpapered lightly and treated with S-W Mahogany Paste Filler. (Follow instructions on page 26-*a*). After sandpapering to a perfectly smooth surface with 00 sandpaper when the Filler has been allowed to dry about 24 hours, apply two or more coats of S-W Rexpar Varnish or S-W Kopal Varnish reducing the first coat with about one pint of turpentine to a gallon of varnish. From

36 to 48 hours of thorough drying must be given between coats, sandpapering the first coat of varnish to a smooth surface. For a dull finish the final coat can be lightly rubbed with pumice-stone and oil, or pumice-stone and water after the varnish has been allowed to become thoroughly hardened (after 48 hours).

(*a*) **Doors, Porch Ceilings, Boats, Canoes, Golf Clubs, etc.—To Varnish**—S-W Rexpar Varnish or S-W Kopal Varnish should be used for varnishing these surfaces. For new work, apply three coats, thinning the first coat with pure spirits turpentine in the proportion of one pint of turpentine to one gallon of varnish. Allow 24 hou between coats and sandpaper first and second coats with 00 san paper. *On previously varnished surfaces* apply two or three co of Rexpar as directed for new work, cleaning the surface thoroug to remove spots, stains, etc., which would show up under the tra parent varnish.

(*b*) **Doors—To Enamel**—Apply two or more coats of S-W Mast Painters Under-coating, S-W ODP or S-W Flat-Tone White produce a surface and foundation for the enamel coat. Allow hours for drying of each coat and sandpaper with 00 finishing pap avoiding all brush-marks. After a perfect under-coating is secur apply two coats of S-W Old Dutch Enamel, allowing 48 hours betwe coats for drying.

(*c*) **To Finish Cement, Concrete, Stucco and Brick**—S- Concrete Finish is suitable for surfaces of this kind. The parts to treated with it should be dry and free from dust and grease. S- Concrete Wall Finish should be applied as it comes from the ca For best results on concrete of ordinary texture, two coats a sufficient. For very smooth, hard surfaces, the first coat may thinned with pure spirits turpentine, using from a pint to a quart turpentine to each gallon of paint.

(*d*) **Barns, Corn-Cribs, Fences and Sheds—To Paint**—S- Commonwealth Barn Paint (made in red and gray) is excellent for the exterior of such buildings. Stir the paint thoroughly from the bottom of the can and apply first coat thinned with one-half gallon pure raw linseed oil to each gallon of paint, using a good bristle brush. Second coat to consist of the paint reduced with about one-quarter gallon oil to a gallon of paint. Keep well covered when not in use. In painting an old surface, see that all loose paint is removed.

(*e*) **Roofs, Fences, Rough Lumber, etc.—To Paint**—S-W Creosote Paint, a prepared material made up in a full line of good colors, is suitable for surfaces of this type. To apply, stir thoroughly from the bottom of the can and brush out well instead of applying in a thick, heavy coat. If necessary to thin, use about a pint or a quart of pure raw linseed oil to each gallon of paint. On old surfaces, see that all loose paint is removed.

(*a*) **Perches and Inside of Chicken-Houses—To Protect**—Use S-W Lime-Sulfur Solution or S-W Carbolic-ol. Apply with long-handled window or wall-paper brush, or apply by spraying.

(*b*) **Screen Frames and Wire—To Paint**—Use S-W Screen Enamel (made in black and green). Brush the surface well to remove
a coat of the Screen Enamel, brushing it out well instead
heavy coat. Paint the frame with the same
Black.

wn Furniture—To Paint—S-W Porch and
mel is suitable for finishing all styles of porch
enches, seats, with a high gloss, etc. Wash the
thoroughly and see that it is dry and free from
rch and Lawn Furniture Enamel thoroughly
spread the paint on evenly, and not heavily.
sh. If the material seems too heavy for certain
ned slightly with pure spirits turpentine, using
lon of paint.

h Siding, etc.—To Stain—Use S-W Pre-
in as it comes from the package after it has been
ith a broad, flat stick or wooden paddle. (Also
using the stain). Apply two brush coats on lum-
but shingles which have not been laid should be
re being laid and a brush coat immediately after
t soak the shingles in the stain. Dip them in and

(*e*) **Ra** **-Timbers, etc.**—This treatment is frequently undertaken in fin ing the exterior lumber on dwellings, the walls of which have been constructed of concrete or stucco. First apply a coat of S-W Preservative Shingle Stain in color selected, and follow with two coats of S-W Pure Boiled Linseed Oil which should be thinned with pure spirits turpentine, using about one pint of turpentine to each gallon of oil.

(*f*) **Tin and Metal Sheeting, Cornices, etc.—To Paint**—S-W Galvanized Iron Primer (made in gray) should be used as the first coat for galvanized iron, sheet metal surfaces, etc. It is ready for application and should be brushed out thoroughly, and followed within 48 hours with a coat of SWP in desired color. For the garbage-can, sprinkling-can, etc., apply a coat of Galvanized Iron Primer outside and inside.

Exterior Work

(*a*) **Inside of Silos, Hotbeds, etc.—To Paint**—For the painting of such surfaces and for lumber below the ground line, such as the ends of fence-posts, etc., apply S-W Carbolic-ol with a brush, and allow it to soak in thoroughly. This material acts as a preservative.

(*b*) **Farm Machinery, Wagons, Tools, Implements, etc.—To Paint**—Use S-W Wagon and Implement Paint. See that the surface to be painted is clean, free from grease or oil and perfectly dry. Stir from the bottom of the can and touch up the bare and worn spots with a thin coat. Let stand until perfectly dry (about 24 hours) and apply a smooth, even coat over the entire surface, using a bristle brush. Keep well covered when not in use.

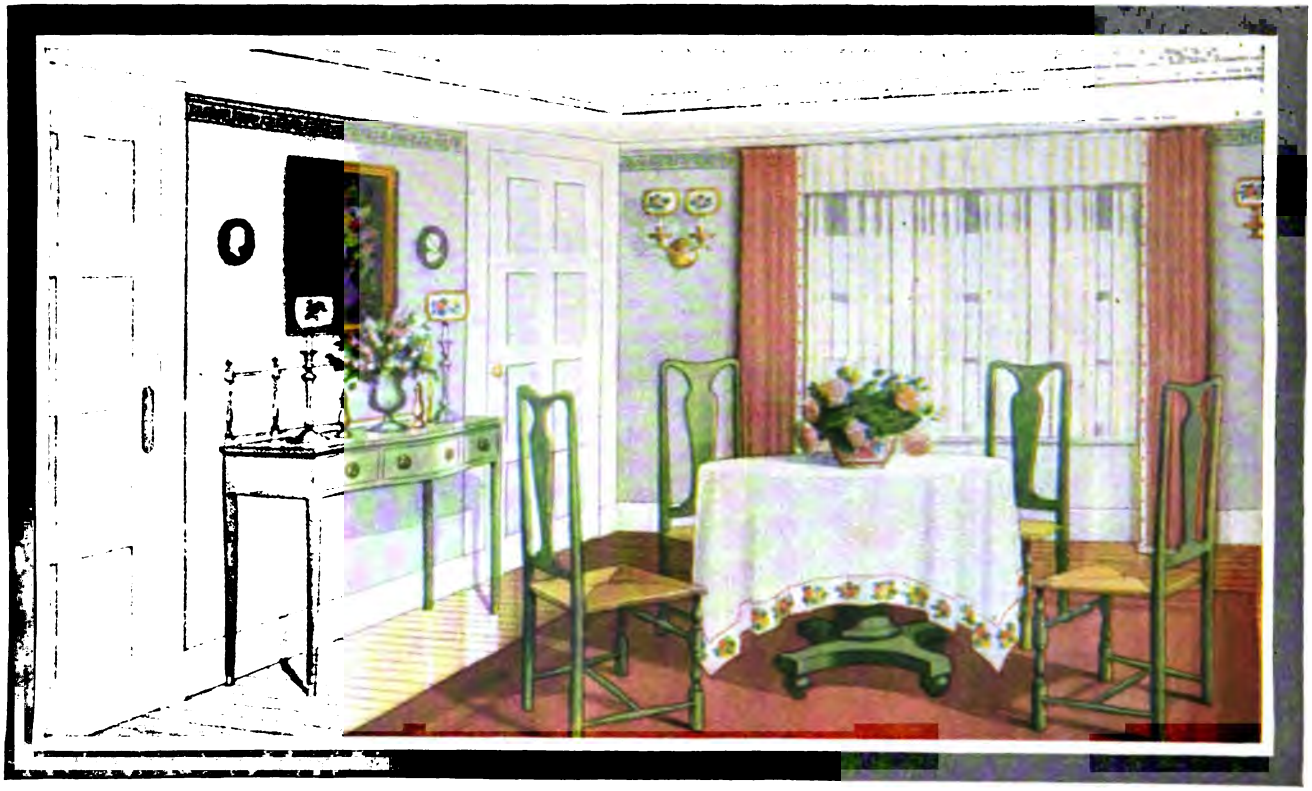
(*c*) **Iron Fences, Blinds, Store Fronts, etc.—To Paint**—S-W Verdelite, a satisfactory green, made in four shades, is suitable for surfaces of this character. Thin to paint consistency with S-W Pure Boiled Linseed Oil. Apply same after thoroughly stirring and brush out well instead of using in a thick, heavy coat. All loose paint on previously finished surfaces should first be removed.

(*d*) **Fire Escapes, Iron Blinds and Other Exterior Metal Surfaces—To Paint**—S-W Metalastic (made in black, brown, green and gray), is an economical, durable paint for preserving and protecting metal surfaces. Before it is applied, all foreign susbtances, such as rust, scale, mineral and animal oil should be thoroughly cleaned off. On small surfaces, this can be accomplished with a wire brush. Where rust scale is deep seated, it is best to also use a gasoline torch. The Metalastic is ready for use, and requires only thorough stirring. Brush out thoroughly and evenly, filling in well around rivets and like places. Two coats should always be given—three are better. S-W Roof and Bridge Paint is another material which can be used to refinish rough lumber, metal, tin, etc. Instructions for its application are the same as above.

(*e*) **Silver, Gold, Brass, etc.—To Clean**—Use S-W Bras-Brite. Shake well in the can before using, and apply to the parts to be treated with a soft cloth, covering thoroughly. Allow to remain on the surface a few minutes and then polish with a clean woolen cloth. This finish is not intended for dull finished brass, but for that which has been finished with a high polish. Bras-Brite is put up in handy screw-top cans, in sizes ranging from half pints to gallons. This treatment is excellent for table silver, watches, etc.

(*f*) **Auto Seats, Buggy Seats, Backs, Chairs, etc.—To Dress Leather**—Apply S-W Auto Leather Dressing with a soft brush and allow to dry thoroughly before subjecting to any use.

(*g*) **Automobiles, Carriages, Buggies, Baby Carriages, etc.—To Refinish**—It is essential before undertaking refinishing of this



An Unusual and Effective Color-Scheme for a Dining-Room

(See Page 47 for Specifications)

kind to see that the temperature under which the work is conducted is about 60, 65 or 70 degrees Fahrenheit. Thoroughly wash the surface to be treated, so that any grease which may be on it will be removed, and when it is completely dry, sandpaper the old varnish coat with medium or fine sandpaper and then dust off thoroughly. Flow on (that is, apply with the brush full) a coat of S-W Buggy and Auto Paint. It should be stirred thoroughly before using. After about 48 hours has been allowed to elapse, sandpaper this surface lightly and apply a final coat of S-W Buggy and Auto Varnish Clear or a coat of S-W Carriage Varnish. If a dull polish is desired, rub this varnish coat after it has been allowed to dry about 48 hours, using pumice-stone and oil for the purpose.

In order that automobile-owners may maintain the good appearance of their cars by refinishing them themselves, we have brought out our Special Automobile Refinishing Outfit. It contains everything necessary for refinishing a moderate-sized car, and if the contents are used as directed, an automobile can be made to look like new with little trouble.

(*a*) **Carriage Curtains, Tops, etc.—To Dress**—Use S-W Enamel Leather Dressing. Have the surface to be painted free from dust and thoroughly dry and apply a coat of S-W Enamel Leather Dressing, brushing out thoroughly. A second coat may be applied within a day's time, if desired.

(*b*) **To Wash Automobiles, etc.**—First remove all mud by washing carefully. Play a stream of water on the surface to be cleaned, using a hose without a nozzle, and held so close that the stream falls on the surface at an angle. Then wash off grease, dust, etc., as directed on page 20-*e* for washing furniture.

(*c*) **To Polish Automobiles, etc.**—Cleaned as directed in the preceding, apply S-W High Polish Fluid Wax with a chamois or soft cloth, rubbing when the wax has been allowed about twenty to thirty minutes to dry.

(*d*) **To Dust and Polish Automobiles, etc.**—When the surface is not muddy use S-W Polish-ol. Apply with soft rag dampened with Polish-ol, rubbing it rapidly over the surface. This treatment removes the bluish cast caused by dampness, etc.

(*e*) **To Recoat Tennis Racquets**—Use S-W Pure Shellac. Brush on one or two coats, allowing about a day between applications. This treatment will serve to preserve the strings or gut and renew the finish of framework as well.

Insecticides

The Protection of Trees, Shrubbery, etc., Against Insects and Diseases—The proper care of decorative shrubbery, ornamental shade-trees, flowers, etc., is of vital importance in assuring pleasant home surroundings. Every tree or plant is subject to attack by insects and disease. Spraying is recognized as the only adequate preventative and cure for these pests. Wonderful results can be secured with a very small expenditure of money, and the following brief information should be of interest to home-owners everywhere:

In the Spring, before the buds burst and while the trees and shrubbery, etc., are still in the dormant state, a thorough spraying should be given with a mixture composed of one part Sherwin-Williams Lime-Sulfur Solution as it comes from the package, to eight parts of water. All branches, twigs and limbs should be thoroughly covered with this solution which tends to eradicate the scale insects which are prevalent in all parts of the country.

Later in the Spring, after the leaves have come out, another spraying should be given all shrubbery, using a mixture made of one gallon of Sherwin-Williams Lime-Sulfur Solution and one pound of Sherwin-Williams Dry Powdered Arsenate of Lead in 50 gallons of water, spraying so as to cover all foliage. This application will prevent the inroads of leaf-eating and chewing insects, as well as all fungus diseases.

A month or six weeks later, an additional spraying should be made, using exactly the same mixture as described in the preceding paragraph. The cost of this treatment is very small, and insures hardy, luxuriant foliage, free from blemish and insect infestation.

Where the insect known as the Rose Louse is prevalent, it is well to make an additional spraying when the louse appears, composed of Tobacco Extract dissolved in water. Satisfactory Tobacco Extracts can be purchased at any seed store, and full directions are usually given on the package.

S-W Pruning Compound should be used to protect trees and shrubbery from which old branches have been removed. It should be applied at once over the wound, which should be cut clean and not jagged. Use either a coarse, stiff brush or a putty-knife for the application. It seals the surface, prevents "bleeding" of the sap. It does not wash off with the weather.

Further information and complete data on the subject of spraying the home garden can be procured upon application to the Insecticide Department of The Sherwin-Williams Co.

General Directions—Interior

How to Select Finishes for Interior Wood Surfaces

(*a*) **Open-Grained Woods,** such as oak, ash and chestnut, can be filled with S-W Paste Fillers (which can be had in shades to match finish desired) or given the Mission effect by finishing without the filler using varnish or stain and varnish. Where the wood is to be stained it is necessary to use the stain before the filler. The natural finish may be produced with one of the Paste Fillers and Varnish.

(*b*) **Close-Grained Woods,** such as pine, cypress, fir, redwood, spruce and hemlock, do not require the use of Paste Fillers. They can be finished natural with varnish, with shellac and wax, or they can be stained and varnished or stained and waxed.

(*c*) **Whitewood, Poplar, Cottonwood and Birch** are excellent for enamel work. Pine can be used, but requires a first coat of S-W Shellac to bind rosin or pitchy sap.

Helpful Suggestions

(*d*) *To thin S-W Golden Oak Stain, S-W Oil Stain and Varnishes,* use turpentine; to thin S-W Handcraft Stain, use S-W Handcraft Stain Reducer.

(*e*) *To wash furniture and woodwork,* use S-W Flaxoap with three buckets of water and two sponges. One bucket and sponge should be used for the soap and water washing, another bucket and sponge for first rinsing, and the same sponge with the third bucket of clear water for second sponging.

(*f*) *To remove paint and varnish* from window-panes or other glass surfaces, use hot acid vinegar, or for a more simple method, apply S-W Taxite to soften the paint when it can be scraped or wiped off.

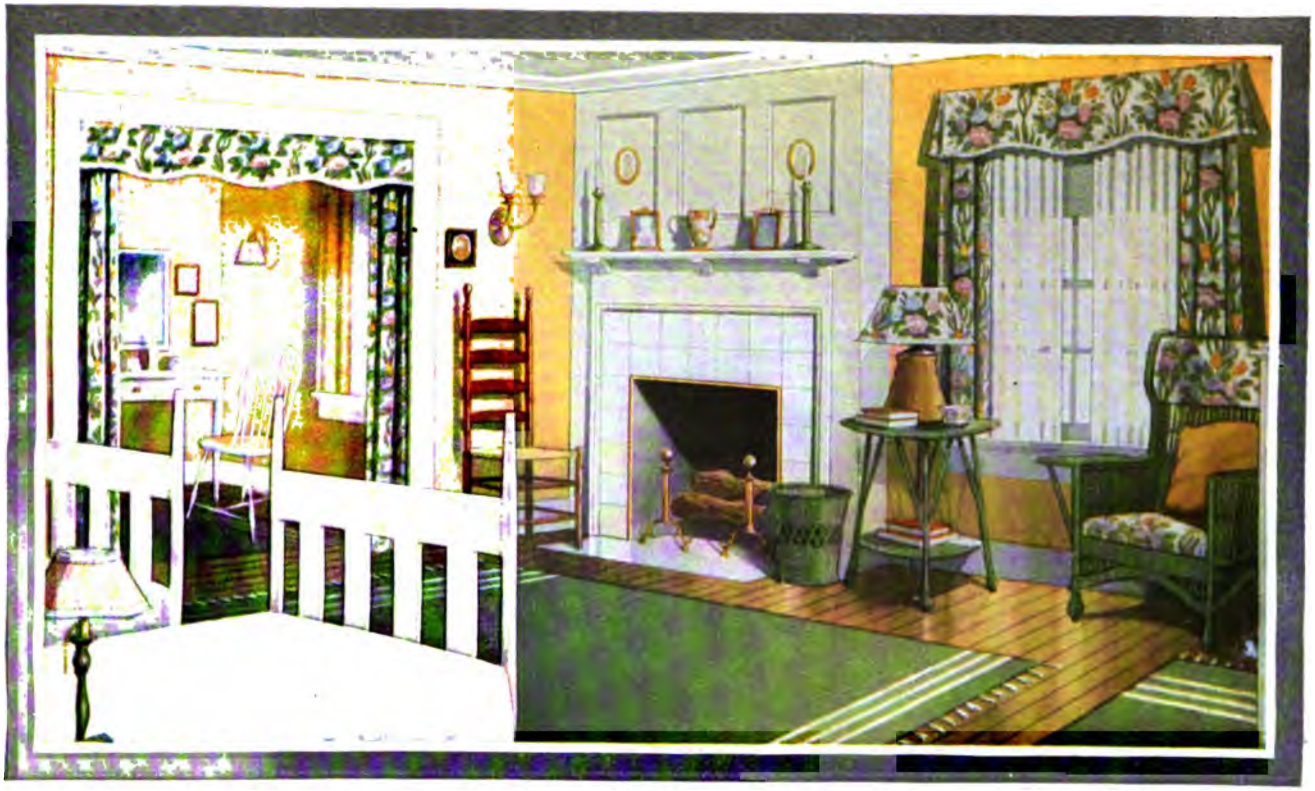
(*g*) *To make a high room look lower,* use a drop ceiling; that is, bring the ceiling color on to the wall for about 16 to 24 inches according to the height of the room.

(*h*) *To make a narrow room look wider,* use a plate rail or chair rail.

Interior Estimating

(*i*) In estimating the amount of materials required for interior decoration, it is necessary to figure each room separately. The three dimensions of the room are necessary.

To determine the quantity of Flat-Tone for three-coat work on the ceiling, multiply the length by the width which gives the square feet of ceiling area, divide this by 225 (covering capacity per gallon of Flat-Tone for three coats). This will give the approximate number of gallons required for the ceiling.



A Bright, Cheerful Bedroom

(See Page 47 for Specifications)

General Directions—Interior

The quantity of Flat-Tone required for three-coat work on the walls can be estimated in the following manner: Multiply the distance around the room by the height. This gives the number of square feet of wall space. Subtract from this 20 square feet for each window and 21 square feet for each door. Divide the number of square feet which remain by 225 (covering capacity in square feet of Flat-Tone for three-coat work). This gives the quantity in gallons required for the walls. The first coat of Flat-Tone should be mixed in equal parts with Flat-Tone Mixing Size. If the number of gallons of Flat-Tone needed for the ceiling and walls be added and the result be divided by 6, it will give the amount of Flat-Tone Mixing Size necessary for both ceiling and walls.

For estimating materials required for blended or stippled walls, write the S-W Decorative Department and information will be furnished.

In a room of average size (about 12 by 15), there is usually the following woodwork:

2 Doors (21 square feet each)	42 square feet.
Baseboard (6 inches high)	27 square feet.
3 Windows (20 square feet each)..	60 square feet.
Total......................	129

The distance around the room multiplied by the height of the baseboard gives number of square feet in the baseboard. Should the surface be finished natural by applying a coat of Shellac and then two coats of Scar-not Varnish the procedure will be as follows in estimating: Divide the square feet of woodwork by 480 (covering capacity per gallon for one coat of Shellac) which will give the number of gallons of Shellac necessary. Multiply the square feet of woodwork by 2 (for two-coat work) and divide by 300 (covering capacity of Scar-not to the gallon), the result giving the number of gallons Scar-not Varnish needed. To determine the number of gallons of stain required for woodwork, divide the area of the surfaces to be treated by 480 (number of square feet Handcraft Stain covers to the gallon). If filler is to be estimated, divide the area in square feet by 30 (which will designate the number of pounds needed).

For a white enamel finish, divide the area of woodwork in square feet by 250 (covering capacity of one gallon of under-coat for three-coat work). This will give approximate number of gallons for under-coating. Divide the square feet of woodwork by 250 which will give the number of gallons required for one coat of white enamel.

If floors are to be finished natural, three coats of Mar-not will be necessary. Multiply the area of the floor (length times width) by 3 and divide by 480 (covering capacity Mar-not one gallon, one coat).

General Directions—Interior

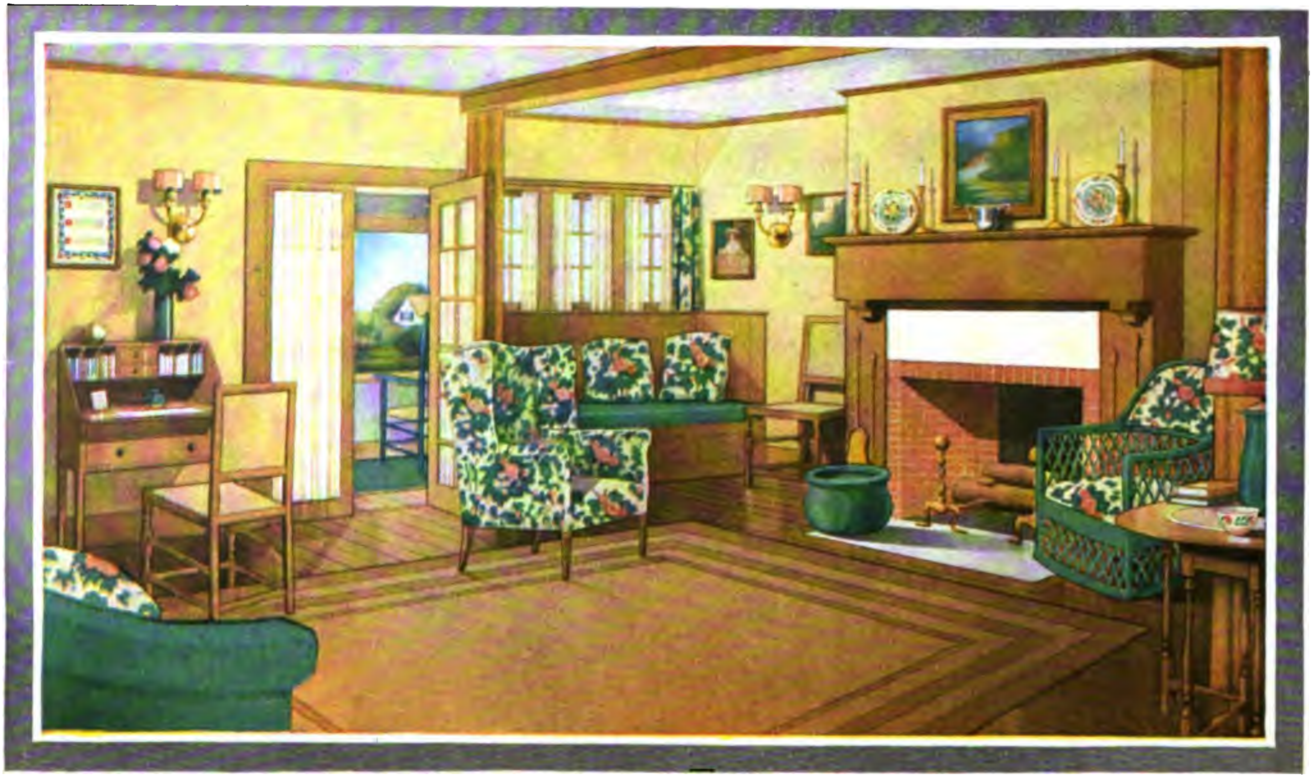
To estimate for floors to be stained, divide area of floor by 480 (number of square feet Handcraft Stain and Handcraft Stain Reducer cover per gallon) which will give the number of gallons of Handcraft Stain Reducer with which about one-sixth as much Handcraft Stain should be used.

(*a*) **Waxing**—The wax intended for polishing, usually comes in paste or semi-solid form. S-W High Polish Fluid Wax is one exception. To apply wax, rub a soft cloth well on the wax and then vigorously rub the cloth on the woodwork so that there will be a sufficient amount of heat generated by friction to partially melt the wax. When used in this way, a smooth, even coat of the wax can be applied. Often the cloth is wound around a weighted brush or other article to give weight and increase the heat of friction. To estimate the number of pounds of Floor Wax required, divide the area of the floor by 250 (covering capacity of Floor Wax per pound.)

(*b*) **Drying**—If a preceding coat of paint, varnish, enamel, stain, etc., is not allowed to dry sufficiently before applying finishing material, difficulty may arise. Neither is it advisable to allow the coats too much time to dry, for if bone hard, the surface will not have enough "tooth" or hold for the new material.

(*c*) **Rubbing With Pumice-Stone and Oil**—In many of the instructions in this booklet, rubbing with pumice-stone and oil over varnished and enameled surfaces is directed. The purpose is to produce a dull-polished non-gloss surface. Use powdered pumice which can be bought at any drug or hardware store. A half pound will be plenty for the woodwork or floor in a room of average size. Dip a nail brush or vegetable brush, or a soft cloth in ordinary sweet oil or in linseed oil and then in pumice, and then rub back and forth on the surface to be treated, working on about a square foot at a time. About 12 or 15 strokes on each part of the surface will serve to wear down the gloss and give the desired effect. If any pumice remains on the surface, it can be wiped off easily.

(*d*) **Filling Cracks in Plaster**—A wall should present an unbroken surface before it is decorated. If there are cracks or nail-holes, they can be filled until even with the surface. Use plaster of paris. Mix with water to form a thick paste. To keep the paste in this consistency, add a very little water to it as you go along, and as the preparation thickens. Force this paste into the cracks and holes with a flexible knife, such as is used for cake-mixing, or with the fingers. If this mixture is allowed to stand until it becomes hard, it can not be used again, and should be discarded and a new batch should be made.



A Livable Living-Room

(See Page 47 for Specifications)

General Directions—Interior

(*a*) **Paint and Varnish Remover**—S-W Taxite removes paint or varnish from any surface and does not interfere with the drying or durability of subsequent coats. Taxite does not injure the skin, discolor the most finely grained wood, nor soften glue. It is manufactured in both liquid and semi-liquid form, the latter is for use on vertical surfaces.

Apply one coat with a brush and allow to stand for ten or fifteen minutes. Then scrape off with a blunt knife or piece of glass. Clean with benzine, gasoline or wood-alcohol (being careful to have no flame near) and the surface is ready for refinishing. Do not rub Taxite in with the brush. If the first coat fails to remove the paint or varnish, apply another coat and allow to stand ten or fifteen minutes before scraping and cleaning.

*BRUSHES—HOW TO USE

(*b*) To apply varnish so that it will be free from bubbles, use an oval or flat chisel brush, ranging in width from 1 inch to 4 inches, according to the size of the surface to be varnished.

For painting interior walls and ceilings, use a 4½-inch or 5½-inch bristle brush. Either is convenient to use; the inexperienced person will probably prefer the smaller. The same kind of brush or a 4-inch fitch brush may be used to apply tinted Glazing Liquid with which preparation mottled and blended effects can be secured, and to apply stain for woodwork, floors and furniture.

Keep varnish brushes in turpentine, other brushes may be left standing in water, provided they have been cleaned. If brushes become stiff with paint, heat vinegar to the boiling point and allow them to stand in it, or, use S-W Taxite, the paint and varnish remover.

Paint for interior walls and ceilings should be applied with a long, even stroke from side to side. Woodwork finishes (stain, varnish and enamel) should be applied in the direction in which the wood grain runs.

Glazing Liquid when tinted for mottled and blended effects can be applied with almost any stroke, or even by striking the brush broadside against the surface. It should not be applied thinly, for as much color as the brush will hold without dripping, should be used. It is advisable to work quite rapidly with the Glazing Liquid, so that it will not set before there is time to mottle the color with the cloth or sponge advocated for the purpose. It is well to have an assistant for the glazing process, so that while one applies the paint the other can follow to do the blending.

***Note**—Some brushes may only be designated by their trade name, and your dealer can supply you with the right kind.

Interior Work

(*a*) **New Woodwork and Furniture—To Stain and Varnish**—There are open and close-grained woods to consider under this heading. To stain baseboards, doors and other open-grained interior woodwork, use S-W Golden Oak Stain or S-W Handcraft Stain in color adapted to the wood (for further detail on this subject, see page 20-*a*, *b*, *c*). Apply with a soft fitch brush (see page 25-*b*), and after allowing about 24 hours for thorough drying, spread on the surface a thin paste made of S-W Paste Filler in desired color (S-W Fillers are made in Antique Oak, Golden Oak, Red Oak, Mahogany, Walnut and Transparent Shades) thinned to a creamy consistency with turpentine. The filler will harden as it is allowed to dry. But, before it becomes dry (that will be in about 20 minutes after application), wipe across the grain of the wood—the direction opposite to that in which the streaks in the wood run—using burlap or excelsior. After allowing filler to set for about 24 hours, follow with a thin coat of Shellac, and after allowing it to dry about 24 hours, sandpaper lightly and apply two coats of S-W Scar-not Varnish or S-W Excello Varnish. Lightly sandpaper the first coat after it has been applied for 24 hours, and rub the last coat to a dull polish with pumice-stone and oil or pumice-stone and water, when it has been on 48 hours.

Note—When surfaces are to be subjected to an unusual amount of moisture, instead of the Shellac Coat it is best to use S-W Scar-not Varnish immediately over the filler, reducing the first coat of varnish in proportion of one pint of turpentine to one gallon of varnish—the succeeding coats to be applied as the varnish comes from package.

Close-grained wood, such as pine, cypress and birch, should be treated the same except that the use of the paste filler should be omitted.

A dull polish or non-gloss finish may be produced on wood surfaces not exposed to foot-wear without the labor of rubbing with pumice-stone and oil, by using S-W Velvet Finish Varnish No. 1044 as a last coat.

(*b*) **Woodwork, Furniture, etc.—To Wax Finish**—A wax surface can be produced over any finish on woodwork by applying a final coat of S-W Furniture Wax. To produce a wax finish when staining woodwork and for moderately-priced work, apply one coat of S-W Handcraft Stain in the desired color and allow to dry overnight. Then use one coat of S-W Mission-lac which after drying about 24 hours should be followed with a coat of S-W Furniture Wax. The latter should be applied with a soft cloth, rubbing off all surplus wax, and in this way giving the surface a polish. Although this finish is not as durable and protective as one employing a varnish such as S-W Scar-not Varnish, it serves satisfactorily where moderately-priced work rather than a lasting finish is required.

Interior Work

(*a*) **Natural or Varnish Finish for Woodwork, Chairs, etc.**—On woodwork, such as oak and chestnut which has an open grain, use S-W Paste Filler in desired color. After the filler has been allowed to set about 20 minutes and before it can become thoroughly hardened, wipe off the surplus filler—that which has not entered the pores of the wood—by using a piece of burlap or a handful of excelsior across the grain of the wood. When thoroughly dry (after 24 hours) apply two or three coats of S-W Scar-not Varnish or S-W Excello Varnish, allowing 24 hours for drying between coats and sandpapering the first coat lightly with 00 finishing paper, rubbing the last coat with pumice-stone and oil or pumice-stone and water to a dull finish (after 48 hours). *Close-grained wood*, such as pine, cypress and birch, may be similarly treated except that the paste filler is not required, and in place of it a coat of S-W Pure White Shellac should be used, sandpapering it when dry before applying the varnish coat.

(*b*) **Woodwork or Furniture—To Enamel**—Whitewood, poplar or birch, permit of producing the best enamel finishes. Pine, cypress, etc., can be used, but should be first coated with Shellac which will prevent pitch or sap in the wood from discoloring the enamel. To produce the proper white under-coating for the enamel—which is semi-transparent and should be used for the final coat or coats—apply S-W Master Painters Under-coating or S-W Flat-Tone White in three or more coats. After allowing 24 hours for drying, lightly sandpaper each coat with 00 sandpaper. Do not drag the sandpaper in the same direction with the brush strokes, if there are any of the latter, but use it across the streaks left by the brush. Then apply one or more coats of enamel, using S-W Old Dutch Enamel, S-W Snow White Enamel or S-W Enameloid White (the latter should not be used where a rubbed finish is desired). For fine interior work, rub the last coat of enamel to a dull polish with pumice-stone and oil or pumice-stone and water. To secure a dull finish without rubbing, use S-W Old Dutch Enamel Dull for the last coat.

(*c*) **Mahogany, Birch or Maple—To Mahoganize**—Apply one coat of S-W Permanent Mahogany Stain No. 700 (made in Light Mahogany, Dark Mahogany and Brown or Antique Mahogany). Allow 24 hours to dry and sandpaper very lightly with 00 finishing paper. Then fill the grain of the wood (maple and similar woods do not require the filler) with S-W Mahogany Paste Filler, wiping off across the grain with burlap or excelsior before the Filler has become hard. After 24 hours, apply a coat of S-W Pure White Shellac, and when it has been allowed to dry a day and a night, sandpaper it lightly with 00 finishing paper. Then apply two coats of S-W Scar-not Varnish, the first of which should be sandpapered after being allowed to dry 24 hours and the second rubbed with pumice-stone and oil to a dull polish after standing 48 hours. After another day, polish

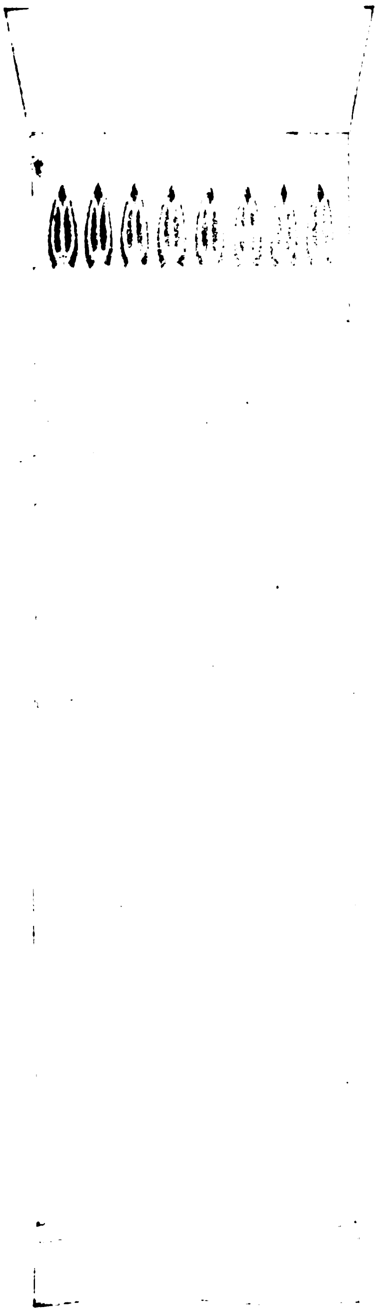


Plate 1

(See Page 48 for Specifications)

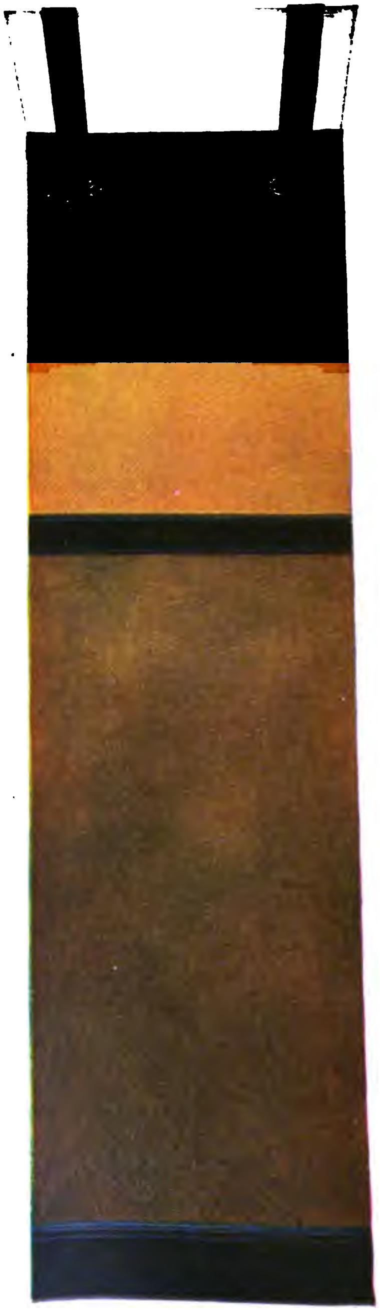


Plate 2

(See Page 48 for Specifications)

with rottenstone (a greasy substance to be had at any hardware store).

(*a*) **Woodwork and Furniture—To Refinish**—*To produce the effect of a stained and varnished surface* without removing the old finish, apply a coat of S-W Brighten Up Ground, allowing this to dry 24 hours. Then use a Brighten Up Stain in color desired, applying as it comes from the can. As this coat is being brushed on, and before it can dry (work at about a square yard at a time), drag an old, clean whisk-broom over the surface to suggest the grain of the wood by the streaks its bristles leave. This Brighten Up Stain Finish dries with a gloss, but a dull finish can be obtained by following with a coat of S-W Velvet Finish Varnish No. 1044. This Varnish dries flat.

To revarnish a surface which is not badly discolored, remove grease, stains and other substances which may not be apparent but exist on a used surface — by washing with soap and water. When the article is dry, apply one or two coats of S-W Scar-not Varnish, allowing not less than a day between coats for drying. The first of the two coats should be lightly rubbed with 00 sandpaper just before applying the next coat, and the gloss of the last coat may be rubbed to a dull polish with pumice-stone and oil after it has been allowed to dry forty-eight hours.

(*b*) **Previously Finished Wood Surfaces—To Grain**—Old woodwork, cupboards, furniture, etc., where it is desirable to give an appearance similar to the stained and varnished finish on new work, should be treated as follows: Clean the surface thoroughly by washing and rinsing well. Allow to dry—sandpaper smooth any rough spots and remove loose paint. Then apply a coat of S-W Brighten Up Stain Ground. Stir this material thoroughly and apply with a four-inch, flat bristle brush. Keep the material stirred as applying same, but should it become too thick for easy application, add just enough turpentine to bring it back to its former consistency. This coat of paint, which covers up the old finish, should dry a day or so before proceeding with the work. For the second coat, use S-W Graining Preparation. Brush the same smoothly over the surface, covering about an arm's length of surface. Then immediately go over that surface with the graining tool, using it as described in the following: When the entire surface has been gone over with the Graining Preparation and the graining tool, allow the same to dry for a day or overnight. Then follow with a coat of S-W Brighten Up Stain. Use Brighten Up Stain Mahogany, Cherry, Rosewood or Walnut only over the simple, straight grain, as described below under (1). For a dull effect over the Brighten Up Stain, apply a coat of S-W Velvet Finish Varnish No. 1044, as above recommended.

The graining tool, which is so made that it produces three (1), (2), (3) different kinds of grain, is used much like a brush. On one end the rubber is so cut that it gives the simple, straight grain (1).

This suggests such woods as Birch, Walnut and straight-grained woods. To make this grain, take the tool firmly in the hand and place its flat surface on the wood and simply draw the tool along the surface of the wood, holding it so that the fingers do not touch the surface, and keeping this same angle throughout the stroke.

On the rounded surface of the tool the rubber is so cut that a plain oak grain can be produced (2). Hold the handle in a vertical position and then rock the tool in the direction of the grain as you glide the tool along—a little practice will soon show you how to handle the tool for best results. To more clearly represent the actual oak graining, go over the surface (immediately after the above graining has been undertaken) with the straight edge of the tool as in (1). To produce the quartered oak grain, use the side of the tool marked by the irregular pieces of rubber (3). Simply draw this end of the tool across the graining preparation with a rocking motion, and then reverse the handle and use the straight edge as in (1).

Note—Always use the graining tool in the same direction as the original grain.

To refinish as in new work, first remove old wax with turpentine and old paint or varnish with S-W Taxite as directed on page 25-*a*. When the original surface of the wood has been exposed in this way, proceed as directed for new work on pages 26 and 27.

(*a*) **Woodwork, Shelves, etc.—To Paint**—An excellent material with which to refinish kitchen furniture, woodwork, shelves, etc., is S-W Family Paint. It is easy to apply and comes in beautiful colors. Make certain that the surface is free from grease and perfectly dry, and apply the paint in two coats as it comes from the can after being thoroughly stirred. Allow about 24 hours for drying between coats.

(*b*) **Floors—To Varnish**—First apply S-W Paste Filler (see page 26-*a*,) in desired color, if the floors are of oak or another open-grained wood. When thoroughly dry, that is, after about 24 hours, sandpaper the surface till smooth with 00 sandpaper. Then apply three coats of S-W Mar-not Varnish, the first coat to be thinned with one pint of pure spirits turpentine to each gallon of Mar-not. The other coats of varnish should be applied as the material comes from the can. See that each coat is given about 24 hours to become dry before applying the next. For a dull finish, the last coat should be rubbed with pumice-stone and oil after it has been allowed to dry at least 48 hours.

Floors of pine and similar close-grained wood do not require paste filler. Aside from this, however, treatment of them should be as directed above for the natural varnish finish.

Note—Where floors are finished with S-W Mar-not Varnish, never use liquid fillers or shellac as under-coatings.

Interior Work

(*a*) **New Floors—To Stain**—If a color darker than the natural is desired on oak and other open-grained wood floors, apply a coat of S-W Handcraft Stain diluted sufficiently to give the right color with Handcraft Stain Reducer, or use S-W Oil Stain thinning a gallon of stain with a half gallon of turpentine (after allowing stain to take effect about 20 minutes after application, wipe off the surplus stain with a soft cloth). After about 24 hours, follow the stain with a coat of S-W Paste Filler in color desired, and before it has set hard (within 20 minutes of application) wipe off across the grain with burlap or excelsior. When this in turn is dry, apply three coats of S-W Mar-not, thinning the first coat with one pint of pure spirits turpentine to each gallon of Mar-not Varnish and using the second and third coats as Mar-not comes from the can. Allow 24 hours for thorough drying between coats and rub each coat except the last with 00 sandpaper. For a dull finish the last coat should be rubbed with pumice-stone and oil.

Pine floors may be treated in the same manner, omitting the use of the paste filler.

(*b*) **Floors—To Wax**—To produce a wax finish on new floors and retain the natural color of the wood, apply a first coat of S-W Natural Paste Filler if the wood is open grained like oak, chestnut and ash. When the filler has been allowed 24 hours for drying after that part of it which did not fill the pores of the wood was wiped off across the grain with burlap, apply one or two thin coats of S-W Pure White Shellac, allowing 48 hours for each coat to dry. Then apply one of the following: S-W Floor Wax, S-W High Polish Fluid Wax, S-W Floor-wipe or S-W Polish-ol with a soft cloth, or S-W Dancing Floor Wax sprinkled on, bringing the surface to a wax polish. Pine floors may be treated in the same manner, omitting the use of the Paste Filler.

Floors which are to be stained before being given the wax finish should receive a coat of Handcraft Stain diluted sufficiently to give the right color with Handcraft Stain Reducer and this should be allowed to dry overnight. Then proceed as directed above for the application of Paste Filler, Shellac and Wax.

(*c*) **Floors—To Paint**—It is on old floors which have been badly discolored and on which a moderately-priced finish is desired that painting is usually undertaken. The surface should be first cleaned and entirely freed of grease and moisture. Two coats of S-W Inside Floor Paint should be applied, allowing 48 hours between coats.

(*d*) **Floors—To Refinish**—To refinish floors that are in unsatisfactory condition and secure effects such as can be had on new work, remove the old finish to expose the original surface of the wood. The method of procedure for this operation is to take off the wax with turpentine and to soften the varnish, shellac or paint on the surface with S-W Taxite as directed for the use of that material on page 25-*a*. When the floor has been restored to its original unfinished condition in this manner, varnish or stain and varnish as directed for new work, pages 30-*b* and 31-*a*, *b*.

To refinish old floors and give the effect of a stained and varnished surface without removing the old material, use S-W Brighten Up Finish Floorlac. First apply a coat of Floorlac Ground as it comes from the can after making certain that the surface is free from grease. When 48 hours have been allowed for thorough drying, apply a coat of S-W Floorlac in the color selected, using a rather coarse brush for the application and then pulling an old clean whisk-broom over the surface before the finish has set hard. Only such amount of surface should be covered as can be conveniently handled in the above process. When the entire floor surface has been treated in this manner and after the Floorlac in color has dried for 48 hours, follow with one or two coats of Floorlac, Clear or S-W Mar-not Varnish. This surface can then be treated with S-W Floor Wax, if a wax finish is desired.

(*a*) **Old Floors—To Grain**—Apply a coat of S-W Floorlac Ground over the floor surface after it has been thoroughly cleaned, allowing this coat to dry overnight, and then apply a coat of S-W Graining Preparation, following instructions as given under page 29-*b*, for using graining tool, Section 53, for graining of previously finished wood surfaces. Use as a surface finish S-W Floorlac in place of S-W Brighten Up Stain required for woodwork, etc. Then follow the Floorlac coat with two coats of S-W Floorlac Clear, or S-W Mar-not Varnish, sandpaper lightly between coats with 00 sandpaper. The last coat of finish can be gone over with S-W Floor Wax if a wax finish is desired.

(*b*) **Floors—To Oil**—An oil finish is often favored as an inexpensive treatment on store and kitchen floors. It is best to oil floors immediately after they have been laid and before dust and other particles have been ground into the wood. Have the surface clean, free from spots and thoroughly dry. Apply S-W Special Floor Dressing Oil or S-W Floorwipe with cheese-cloth, using as much material as the wood will absorb, rubbing the same into the wood thoroughly. Allow to dry before using the surface.

(*c*) **Rough or Smooth Plaster, Unprepared Canvas, Muslin and Plaster Board—To Paint**—Apply three coats of S-W Flat-Tone Liquid, the first coat to consist of equal parts Flat-Tone and Mixing Size and the second and third coats of Flat-Tone Liquid as it comes from the can after being thoroughly stirred. Allow 24 hours

Plate 1

(See Page 48 for Specifications)

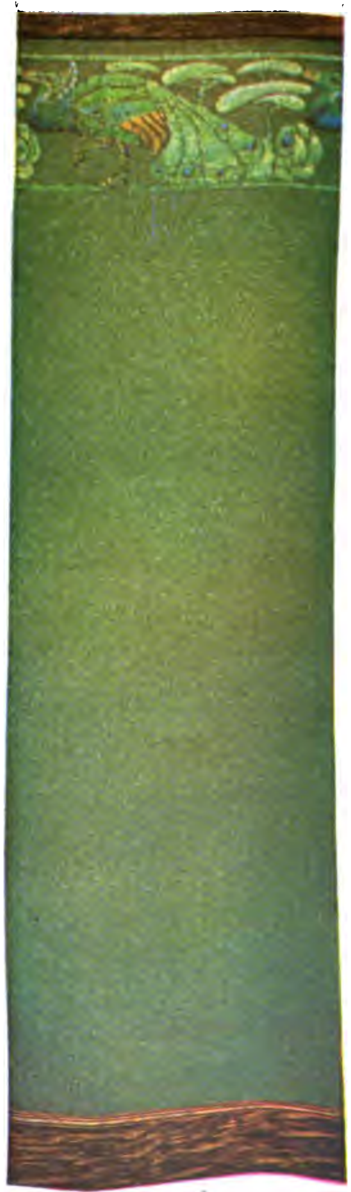


Plate 2

(See Page 48 for Specifications)

for thorough drying between coats. If Liquid Flat-Tone is a trifle heavy for second and third coats, it may be thinned with pure spirits turpentine, using about a pint of turpentine to a gallon of paint.

For walls and ceilings of prepared canvas, prepared muslin or other prepared fabrics, sized plaster board or primed metal, apply two coats of S-W Flat-Tone Liquid as it comes from the can, allowing 24 hours for thorough drying between coats. If the Liquid Flat-Tone is a trifle too heavy, it may be thinned with pure spirits turpentine, using about a pint of turpentine to a gallon of paint.

To paint a glossy surface, it is advisable to first sandpaper the surface lightly to reduce the gloss as much as possible before applying the paint. Then apply S-W Flat-Tone in two coats as it comes from the can after thoroughly stirring. Allow 24 hours for thorough drying between coats. If the plaster shows in any worn spots, treat those parts with a first coat of Flat-Tone to which a small quantity of pure raw linseed oil has been added, using about a quart of oil to a gallon of paint.

To apply Flat-Tone to a surface previously finished with a water-paint or kalsomine, wash off old paint with soap and water and proceed with the application of Flat-Tone Liquid as directed for new work in the first part of these instructions.

It will be advisable to cover up the woodwork and floors as much as possible when washing off the water paint to prevent soiling them.

To use Flat-Tone on surfaces previously papered, soften the paper by using warm water on it with a cloth or sponge so that it can be scraped off with a chisel, putty-knife or other blunt implement. When the paper has been thoroughly cleaned off the surface in this manner and after any cracks that may be in the plaster have been treated or filled as directed on page 23-*d*, proceed with the application of Flat-Tone Liquid as for new work.

(*a*) **Interior Walls—To Finish in the Glaze Effect**—S-W Glaze Effects for walls give a flat surface, with either a blended or mottled treatment. The blended (1) is that which shows the color light at the upper portion of the wall and dark at the lower, with the middle portion in the color half-way between the two, blending from the light to the dark. The mottled treatment (2) is that which shows two or three colors evenly distributed over the wall surface, but these two or three colors give a pleasing iridescent color, for instance, of a greenish, gray-blue—if green, gray and blue are used—or a warm russet-brown shade—if yellow, green and red are used.

To produce these effects the same under-coating of Flat-Tone is required. This should be applied as directed for Flat-Tone finish on plaster wall surfaces, etc., page 32-*c*.

Interior Work

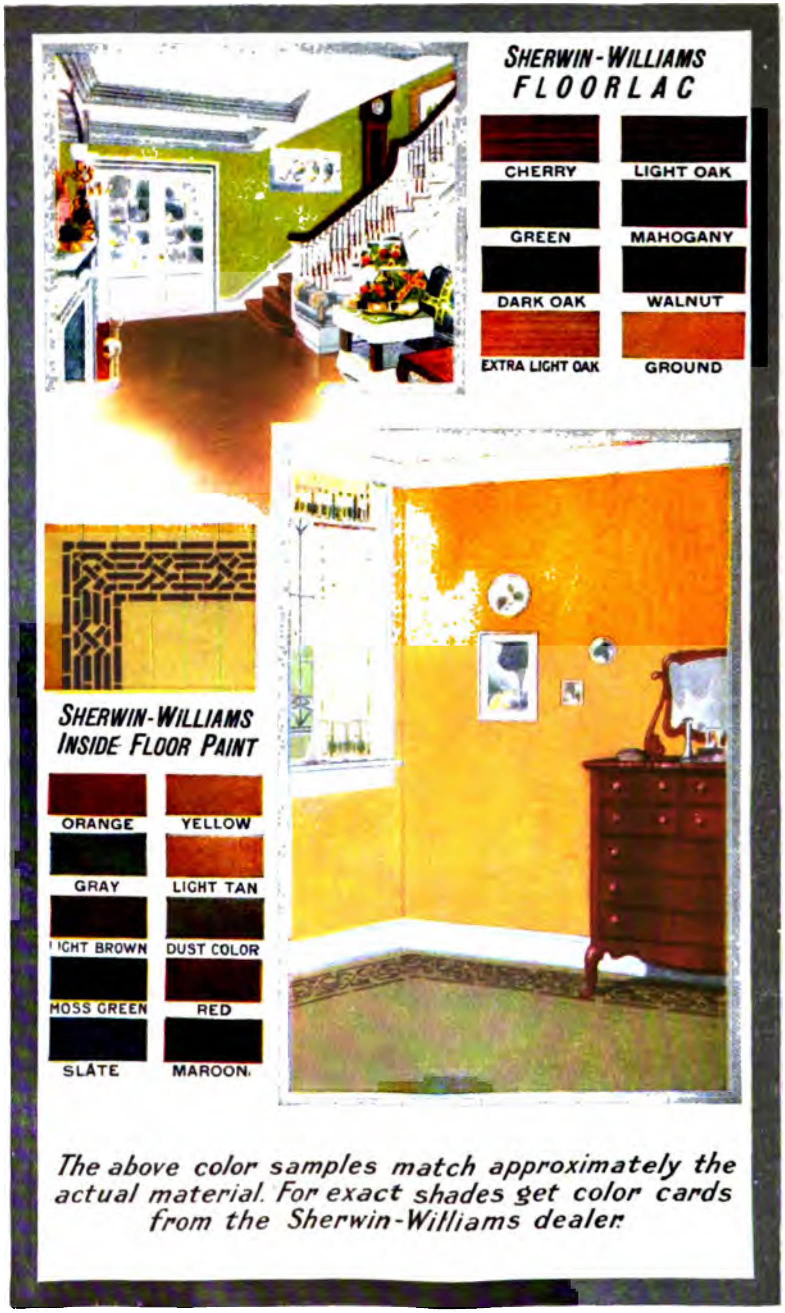
To glaze the Flat-Tone surface, use S-W Glazing Liquid and S-W Glaze Colors, and apply roughly to the wall surface with a good sized wall-brush.

A mixture of a brushing consistency is obtained with the Glazing Liquid and the Glaze Color, the latter coloring the former (which is a colorless material) and giving it a shade corresponding to the Glaze Color used. For medium colors about ¼ pound tube of Glaze Color should be added to 1 quart of the liquid. Better to add less than that at first, to avoid too dark a shade.

Directions for Producing (1) the Blended Treatment—About one-quarter of the mixture of Glazing Liquid required for the entire wall work should be poured into a separate receptacle. The remainder of the liquid should then be mixed with the necessary Glaze Color. After color and liquid are thoroughly mixed pour about one-third of this mixture into the can containing the uncolored Glazing Liquid. This gives one part of a light mixture and an equal part of the dark. Apply the light mixture roughly with a brush to the upper half of the wall, covering only such a portion of the wall as can be conveniently handled by the one or two workers. Apply the darker mixture to the lower wall, overlapping the lighter color, so that the blending will begin a little higher than the middle line of the wall. Then proceed to finish the surface, eliminating all brush-marks by going over it with a regular wall stipple brush or with a crumpled cloth held loosely in the hand.

To Use the Stipple Brush, which is a large, long, stiff-haired brush, hold it flat against the surface so that the hairs are at right angles to the wall, raise it two or three inches from the wall and then strike the wall gently with the brush; go over the entire surface until a pleasing even effect is produced, wiping the brush with a clean cloth as frequently as it is required, so that the color will not be changed. Begin at the top and work down. Then clean the brush of the darker color before using for the next glazed-wall space.

To Secure the Best Results With the Cloth, select clean but old cloth, without lint (cambric is good), hold the cloth loosely but firmly in the hand. Have enough material to obtain a good grip and to form a soft cushion. Pat the wall surface lightly, giving just a little twist to the wrist before releasing the pressure. This will pick off the superfluous color and will take out all the brush-marks. Before patting the next space, change the position of the cloth to get a clean place, and keep on doing so. This process is almost better than the brush, as the cloth can be kept cleaner than the brush and a more uniform color produced throughout.



SHERWIN-WILLIAMS FLOORLAC

CHERRY	LIGHT OAK
GREEN	MAHOGANY
DARK OAK	WALNUT
EXTRA LIGHT OAK	GROUND

SHERWIN-WILLIAMS INSIDE FLOOR PAINT

ORANGE	YELLOW
GRAY	LIGHT TAN
LIGHT BROWN	DUST COLOR
MOSS GREEN	RED
SLATE	MAROON.

The above color samples match approximately the actual material. For exact shades get color cards from the Sherwin-Williams dealer.

Interior Work

Directions for Producing (*2*) *the Mottled Treatment*—The same methods with regard to mixing color and liquid are required as for the blended work, but each color to be used is mixed separately with the glazing liquid, using two or three cans as may be required. It is not necessary to make a light or dark shade of each color, though it is possible to do so. The mixtures can be applied the same strength on upper and lower portions of the wall and the lighter effect then secured on the upper by patting the wall harder and removing more of the mixture from the surface. Each different color of mixture should be applied with a separate brush, alternating with the two or three colors so the wall will be evenly spotted. The mixtures can be applied roughly, and if the worker uses a little ingenuity very artistic effects will be obtained. The stippling or wiping with a cloth is a most important part of this finish, as the different colors are all pulled together, giving the finished mottled effect.

(*b*) **Walls and Fabrics—To Stencil**—For stenciling plaster, woodwork, canvas or plaster board painted with Flat-Tone or Flat-Tone System Effect, proceed as follows: Apply S-W Flat-Tone Glaze and Stencil Colors or S-W System Effect Colors as we direct in our Stencil Catalogue. Dip the stencil brush or other stiff bristle brush in the color and wipe off surplus color on a piece of waste cloth. Lightly tap the brush or use in rotary motion on that part of the surface which is exposed by the openings in the stencil when the latter has been put in the desired place. Be sure the color does not run or spread under the stencil paper. The latter action in the paint would indicate that the brush is too full of color and must be wiped more thoroughly. When the mixture becomes dry or stiff, it must be thinned with pure spirits turpentine to the consistency of stiff paste. Only a small quantity of this thinner should be used to prevent the color from spreading on the surface to which applied. *Stenciling fabrics* should be undertaken in the same manner. Mix with each color one-tenth as much S-W Stencil Medium to assist in settling the color and permit washing. In fabric stenciling, it is advisable to dispense with using white paint in the mixture of color wherever possible.

If you have never used our stencil material before, write for our new Stencil Catalogue.

For stenciling water-tinted walls, and for scenic painting, mix gum arabic dissolved in water or fish glue with S-W Distemper Color to make a paste and apply with a stencil brush or other stiff bristle brush through the openings in the stencil, which should be placed in position on the wall.

(*c*) **Metal and Plaster Relief Work—To Paint**—Metal or plaster surfaces having relief work can be decorated in the following manner:

Interior Work

Build up a groundwork of S-W Liquid Flat-Tone as directed for Metal and Plaster Surfaces on page 32-*c*, then proceed to glaze this surface with Glaze Color and Glazing Liquid, as explained on page 34-*a*, under "Walls to be Finished in the Glaze Effect." Glaze Color Raw Sienna is satisfactory for most work. Before the Glaze Color finish sets, wipe with gentle pressure. This removes the color from the raised parts, allowing a little tint of the Flat-Tone under-coating to show to some extent, retaining the color in the sunken part of the relief work. This produces a two-toned effect, and brings out the pattern clearly.

(*a*) **Walls and Ceilings—To Enamel**—To prevent the surface from absorbing the paint too rapidly, apply a first coat of S-W Wall Size. When this has been allowed to dry overnight, apply S-W Enameloid or S-W Enamel in the desired shade in two coats, allowing at least 24 hours for thorough drying between coats. Thin the first coat slightly with pure spirits turpentine, using about a pint of turpentine to a gallon of paint, and apply the second coat as it comes from the can.

(*b*) **Keene's Cement, Exterior of Bath-Tubs, etc.—To Enamel**—A groundwork must first be produced with S-W ODP White Lead or S-W Master Painters Under-coating used in three or more coats as may be necessary. At least 24 hours for thorough drying should be allowed between coats. Then apply a coat of S-W Old Dutch Enamel or S-W Snow White Enamel.

(*c*) **Walls With Water Paint—To Tint**—Use S-W Decotint. First stop suction in the plaster by applying a first coat of S-W Special Wall Size. Mix S-W Decotint with cold water, using only enough water to make a heavy paste and stir thoroughly until all lumps have disappeared before thinning still more with water, until a mixture of creamy consistency is secured. Then apply one or two coats of this paint with a wide kalsomine brush. For previously finished surfaces the size coat may be omitted.

(*d*) **Walls—To Kalsomine**—Use S-W Kalso. First stop suction in the plaster by applying a coat of S-W Special Wall Size. Then apply a coat of S-W Kalso after it has been mixed properly, applying the color with a wide kalsomine brush, that is using the color plentifully and dipping the brush into the mixture often. To mix the S-W Kalso, proceed as follows: Mix about five pounds of the dry Kalso at one time, placing it in a bucket and adding sufficient boiling water to make the mixture a heavy paste. Stir with a paddle until free from lumps and then add about a pint and a half of the cold water, after which allow to stand and jell, when it will be ready for application. If too heavy, add a little more cold water. When convenient, mix Kalso the night before and leave it in a cool place to "jell" overnight. For previously finished surfaces the size coat may be omitted. This treatment is excellent for basement walls.

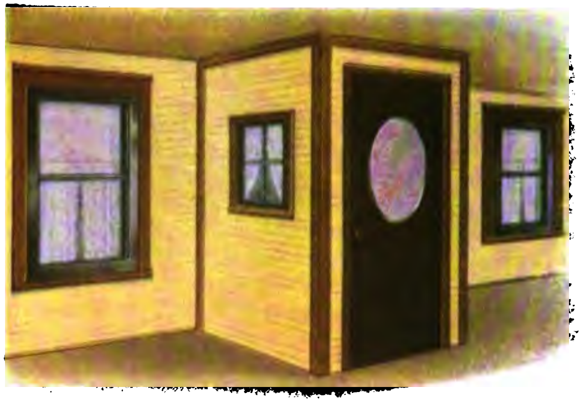
(*a*) **Metal-Lined Bath-Tubs—To Refinish**—Use S-W Bath Enamel. See that the tub is absolutely free from grease and soap, and perfectly dry. Rub the surface with fine sandpaper or with pumice-stone until it is smooth so that the enamel will more easily adhere. Stir thoroughly from the bottom of the can. Apply with a fitch or soft bristle brush, spreading evenly, and in thin coats. Allow about 24 hours for each coat to dry, and for best results, sandpaper lightly with fine finishing paper or moss between coats. Three coats are necessary if a porcelain-like surface is desired. Several days should be allowed after the last coat has been applied before permitting water to touch the surface. Then run cold water in first to assist it in hardening. If the enamel is too heavy to work freely, thin it slightly, using about a pint of turpentine to a gallon of enamel. Keep the enamel well covered when not in use.

(*b*) **Stove-Pipe and Iron Enamel—To Protect**—S-W Stove-pipe and Iron Enamel should be applied with a soft rag when the surface is slightly warm and should be allowed to dry at least 24 hours before subjecting it to high temperature. Under this condition it will be practically smokeless and will produce a better and longer wearing enamel on the surface than any other similar material. This finish is highly inflammable, and should not be exposed to flames or sparks.

(*c*) **Picture Frames, Chandeliers, Bird Cages, Gas Jets, etc.—To Gild**—Use S-W Empress Liquid Gold which is put up ready for application. First clean the surface as thoroughly as possible with a dry, soft cloth. Then apply the liquid gold with the brush which comes with the package.

When there is no objection to mixing, S-W Imperial Gold Enamel may be used. It comes in powder form with S-W Gold Enamel Size, a dish for mixing and a small brush with which to apply it. Mix the powder and size to give a thin paste and apply with the brush after the surface to be treated has been cleaned with a dry, soft cloth.

(*d*) **Concrete and Cement Floors—To Finish**—S-W Concrete Finish for floors is suitable for both exterior and interior concrete and cement floors. When the contractor or architect has been consulted to make sure that the cement or concrete floor is thoroughly dry, apply a first coat of S-W Concrete Floor Finish thinned with about a pint or a quart of turpentine to a gallon of the paint. Second and third coats may be applied as the paint comes from the can. Allow at least 24 hours for each coat of paint to dry thoroughly.



Storm Door
Body **SWP 387**
Trimming **SWP 486**
Sash **SWP Black**
Porch Floor
SW Porch & Deck Paint No. 50
Porch Ceiling
SW Kopal Varnish
Exterior Doors
SWP 393

Greenhouse
Foundation Siding **SWP 461**
Sash **SWP GLOSS WHITE.**

Water Tank etc
WALL
S-W ENAMELOID SATIN GREEN

WOODWORK & WAINSCOTING
S-W VARNISH STAIN LIGHT OAK

FLOOR
S-W INSIDE FLOOR PAINT LIGHT TAN

TANK & PIPES
S-W ALUMINUM PAINT

STOVEPIPE & HEATER
S-W STOVEPIPE ENAMEL

Radiator
1st COAT **S-W GALVANIZED IRON PRIMER**
SECOND-COAT **S-W FLAT-TONE OLD GOLD**
THIRD-COAT **S-W GLAZE COLORS GOLDEN BROWN & OLIVE LAKE each reduced with S-W GLAZING LIQUID and applied separately to produce mottled green & brown tone, or GLAZE COLOR SCARLET ORANGE, reduced with S-W GLAZING LIQUID.**

Interior Work

(*a*) **Andirons, Ornamental Iron, etc.—To Paint**—For these surfaces, use S-W Flat Black. It comes ready for use, and should be applied in one or two coats with a brush. It is also suitable for use on wood surfaces to give the effect of wrought iron.

(*b*) **Radiators, Boilers, Water-Pipes, etc.—To Protect**—There are several kinds of finishes which can be used on radiators, water-pipes, etc. Where a metallic effect is desired, S-W Liquid Gold or S-W Aluminum Paint may be employed. One coat of this material should give a satisfactory surface. For best results, apply when the surface is slightly warm and after use allow at least 24 hours before subjecting to high temperature.

If a finish matching enameled woodwork is desired, use S-W Enamel or S-W Enameloid in the desired tint as directed for woodwork, page 27-*b*. When the radiators are new and have not been given a priming coat at the factory, S-W Galvanized Iron Primer is necessary as a first coat (before building up the under-coating of white paint).

Where the radiators are to be finished to match the walls, employ one of the following methods: (a) If the surface was never painted, apply S-W Galvanized Iron Primer, and in twenty-four hours, apply second and third coats of S-W Flat-Tone and a coat of S-W Glaze Color thinned with S-W Glazing Liquid as directed on page 34-*a* for glazing walls. (b) Apply S-W Aluminum Paint or S-W Empress Liquid Gold, and after twenty-four hours, use S-W Glaze Color thinned with S-W Glazing Liquid as directed for last coat in mottling walls, page 34-*a*.

(*c*) **Decorative Department**—Many times you have a paint problem before you—such as what color-scheme to use on the outside of your house—how to redecorate or brighten up a room—or even what finish would be most suitable for a certain piece of furniture. At such a time you would welcome the advice of an experienced decorator if you could get reliable service without much trouble and without obligating yourself in any way.

The Sherwin-Williams Co. conducts a Decorative Department to cope with just such problems as you encounter repeatedly. It consists of skilled decorators who consider your particular problem and—free of charge—give you advice that places you under no obligation whatever.

To take advantage of this free service it is only necessary to send such information as will guide our decorators in their choice of suitable color-schemes. A rough pencil-sketch, or better still, blue-prints should be sent. With this information to guide them, our decorators send you suggestions best suited to your need. Just furnish the information we have recommended to the Decorative Department, The Sherwin-Williams Co., 601 Canal Road, N. W., Cleveland, Ohio.

Don'ts

Don't leave paint uncovered overnight.

Don't thin paint nor clean brushes near a flame.

Don't use an interior finish for an exterior surface.

Don't leave brushes in paint, stain or varnish overnight.

Don't use a finish prepared for standing woodwork, on floors.

Don't paint around the edges of a floor and leave the center for the last.

Don't use any finishing material without first stirring it thoroughly in the can.

Don't skimp on plenty of good linseed oil when mixing paint for exterior use.

Don't use enamel brushes to stain and expect to use them for enameling again.

Don't repaint until all leaking roofs, gutters and broken spouts have been repaired.

Don't use any new finishing material over a surface which has not been cleaned first.

Don't apply flat oil paint over a water-tinted wall until old material is washed off.

Don't apply new paint over blistered paint without scraping or burning off the old finish.

Don't use boiled oil in any first coat, S-W Primers, or for thinning SWP. Use pure raw linseed oil.

Don't paint on the sunny side of a house, if possible; avoid painting in the direct heat of the summer sun.

Don't use an interior wall brush to apply exterior paint. See suggestions for the selection of suitable brushes on pages 10-*c* and 25-*b*.

Don't apply exterior paint in thick, heavy coats. Brush it out well, as two thin coats cover better and protect the wood more than one heavy coat.

Don't use as a first coat on unfinished wood surfaces any but S-W Primers or SWP thinned with pure raw linseed oil and turpentine according to instructions. (See page 11-*a*).

Don't apply one coat of paint and let it stand a year or so before applying the second. It will have weathered to such an extent that the final results will not be nearly as satisfactory.

Don'ts

Don't apply stain to a painted or varnished surface before removing the old finish. S-W Taxite is a paint and varnish remover.

Don't forget that "elbow-grease" must be used to spread any paint out into thin coats and to brush it well into the pores of the wood.

Don't apply paint over a damp or wet surface, or before you have an architect or a contractor's assurance that basements and the plaster have dried out thoroughly.

Don't paint around fresh mortar beds, on account of the tendency of the oil in any paint to absorb the moisture and fumes from the lime, destroying the life of the oil and causing the paint to flat out and perish.

Don't apply a coat of paint and let it get bone hard before continuing the work. If the under surface is allowed to get too hard, it will not have the proper "tooth" or hold to allow the succeeding coat to get a grip on it.

Don't compare the price of SWP with that of other paints without considering that SWP is the paint that covers most and lasts longest; the paint with a Trade-mark; the paint that is the result of half a century of experience in the manufacture of high-grade finishes; the paint that will preserve the building material most, and the paint that will cost the least in the end.

COVER
THE
EARTH

S-W Porch and Lawn Furniture Enamel

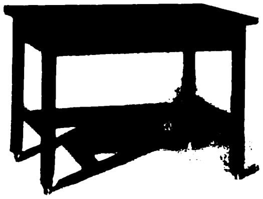
VERMILION	WILLOW GREEN
GRASS GREEN	CARMINE
BOG GREEN	

S-W Wagon and Implement Paint

YELLOW	GREEN	BLUE
	RED	WINE

S-W Buggy and Auto Paint

YELLOW	VERMILION	CART RED
BLUE	CARMINE	LIGHT GREEN
WINE	GRAY	BREWSTER GREEN

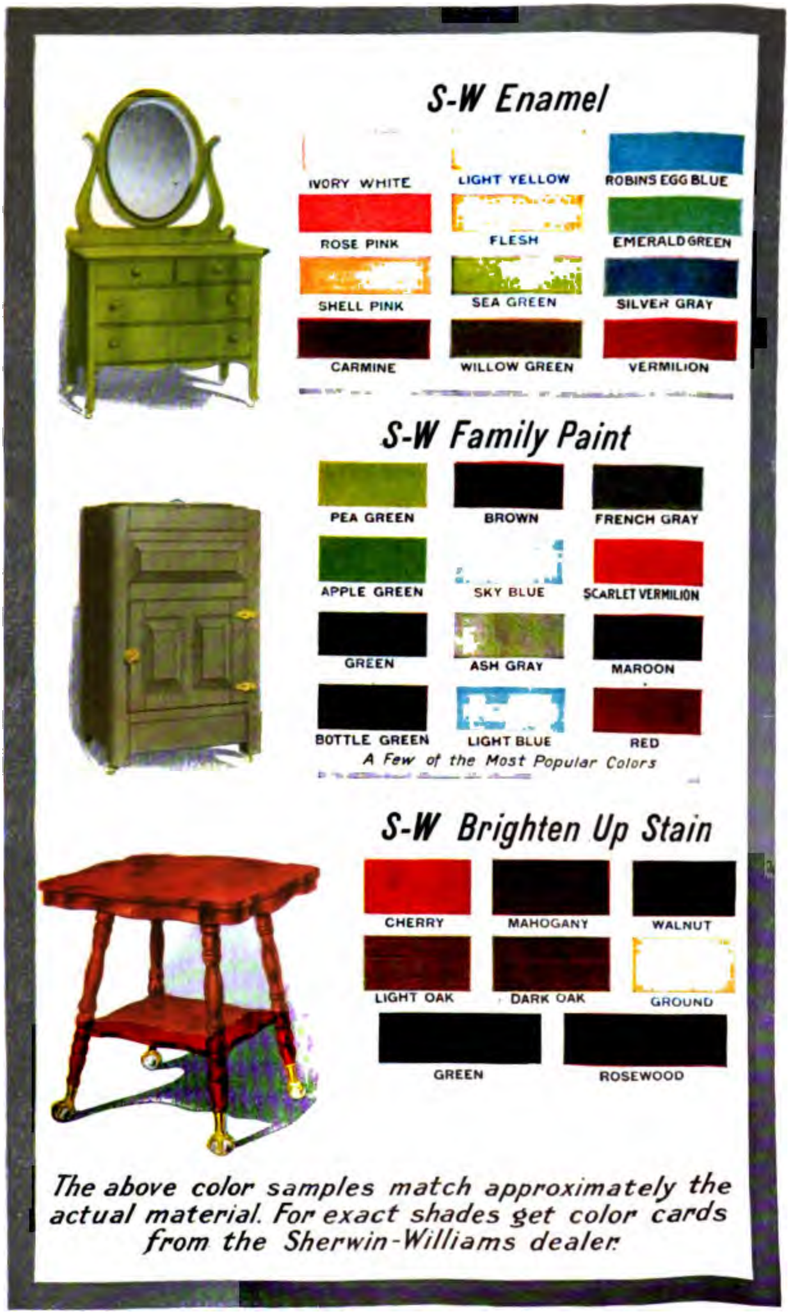


S-W Handcraft Stains

GREEN WEATHERED OAK ON WHITE OAK	OLD ENGLISH OAK ON WHITE OAK	SILVER GRAY ON MAPLE	WALNUT ON BIRCH
BROWN OAK ON WHITE OAK	BROWN OAK ON SOUTHERN PINE	WEATHERED OAK ON WHITE OAK	OLD ENGLISH OAK ON SOUTHERN PINE
MAHOGANY ON MAHOGANY	SILVER GRAY ON WHITE OAK	ANTWERP OAK ON WHITE OAK	FUMED OAK ON WHITE OAK

A few of the most Popular Colors.

The above color samples match approximately the actual material. For exact shades get color cards from the Sherwin-Williams dealer.



S-W Enamel

IVORY WHITE · LIGHT YELLOW · ROBINS EGG BLUE
ROSE PINK · FLESH · EMERALD GREEN
SHELL PINK · SEA GREEN · SILVER GRAY
CARMINE · WILLOW GREEN · VERMILION

S-W Family Paint

PEA GREEN · BROWN · FRENCH GRAY
APPLE GREEN · SKY BLUE · SCARLET VERMILION
GREEN · ASH GRAY · MAROON
BOTTLE GREEN · LIGHT BLUE · RED

A Few of the Most Popular Colors

S-W Brighten Up Stain

CHERRY · MAHOGANY · WALNUT
LIGHT OAK · DARK OAK · GROUND
GREEN · ROSEWOOD

The above color samples match approximately the actual material. For exact shades get color cards from the Sherwin-Williams dealer.

Color Plate Effects

How to Obtain the Effects Shown on the Color Plates

Page 8

Upper Body—S-W Preservative Shingle Stain B-45 or SWP 387.
Lower Body—S-W Concrete Finish Extra Light Gray.
Trimming, Sash and Blinds—SWP Gloss White.
Roof—S-W Preservative Shingle Stain C-71.
Porch Floor—S-W Porch and Deck Paint No. 49.
Porch Ceiling—SWP Gloss White.
Exterior Doors—S-W Old Dutch Enamel White Exterior.

Alternate Specifications

Upper Body—S-W Preservative Shingle Stain C-71.
Lower Body—S-W Concrete Finish Colonial Yellow.
Trimming and Sash—SWP Gloss White.
Blinds—SWP 461.
Roof—S-W Preservative Shingle Stain C-82.
Porch Floor—S-W Porch and Deck Paint No. 48.
Porch Ceiling—SWP Gloss White.
Exterior Doors—S-W Old Dutch Enamel White Exterior.

Page 12

Body—S-W Concrete Finish Cream or Light Gray.
Trimming and Sash—S-W Preservative Shingle Stain B-44.
Roof—S-W Preservative Shingle Stain B-44.
Porch Floor—S-W Porch and Deck Paint No. 50.
Porch Ceiling—SWP 462.
Exterior Doors—S-W Handcraft Stain Fumed Oak.

Alternate Specifications

Body—S-W Concrete Finish Extra Light Gray.
Trimming—S-W Preservative Shingle Stain C-73.
Sash—SWP Gloss White.
Roof—S-W Preservative Shingle Stain C-73.
Porch Floor—S-W Porch and Deck Paint No. 49.
Porch Ceiling—SWP Gloss White.
Exterior Doors—S-W Handcraft Stain Weathered Oak.

Color Plate Effects

Page 17

Ceiling—S-W Flat-Tone White.
Wall—S-W Flat-Tone White.
Stencil No. 38-y—Nile Green 1 part and white ½ part.
Woodwork—S-W Old Dutch Enamel.
Floor—Varnished with three coats S-W Mar-not Varnish.
Curtains—White Marquisette.
Overcurtains—Rose taffeta with floral border.
Rugs—Two-toned velvet.
Furniture—Sea Green enamel, Colonial style.

Page 21

Ceiling—S-W Flat-Tone White.
Wall—S-W Flat-Tone Cream.
Woodwork—S-W Old Dutch Enamel White.
Floor—Pine, stained with S-W Handcraft Stain Walnut reduced with 8 parts S-W Handcraft Stain Reducer and finished with three coats S-W Mar-not Varnish.
Curtains—White Muslin, sill length.
Overcurtains, Hangings, Cushions, etc.—Figured cretonne.
Rugs—Handwoven rag rugs, medium size.
Furniture—White Enamel, Mahogany and Wicker.

Page 24

Ceiling—S-W Flat-Tone White.
Wall—S-W Flat-Tone Buff Stone.
Woodwork—Pine or Birch, S-W Handcraft Stain Fumed Oak, rubbed finish.
Floor—Woodwork stain reduced with 8 parts S-W Handcraft Stain Reducer and finished with three coats of S-W Mar-not Varnish.
Curtains—White Marquisette.
Overcurtains, Cushions, etc.—Figured cretonne, ivory ground, green and pink rose decoration.
Rugs—Two-toned Wilton or Kilmarnock Pattern No. 110, Color No. 91-a.
Furniture—Cretonne upholstered chairs, willow chair in green—also pieces to match woodwork with cane seats and backs.

Color Plate Effects

Page 28, Plate No. 1

Ceiling—S-W Flat-Tone Caen Stone.
Wall—S-W Flat-Tone Silver Gray.
Stencil No. 28-y, applied with S-W Glaze Colors, Orange Lake 1 part and Stencil White 1 part.
Woodwork—S-W Old Dutch Enamel White.

Page 28, Plate No. 2

Ceiling—S-W Flat-Tone Cream.
Upper Wall—S-W Flat-Tone System Effect No. 4, requiring S-W Flat-Tone Old Gold and Glaze Color Brown Sienna.
Lower Wall—S-W Flat-Tone System Effect No. 10, requiring S-W Flat-Tone Old Gold and Glaze Color Mahogany Brown.
Stencil No. 97, Leaves and Binder, Myrtle 1 part and Stencil White 1-10 part. Flowers Stencil White tinted with Chrome Yellow Medium.
Woodwork—S-W Handcraft Stain Flemish Oak.

Page 33, Plate 1

Ceiling—Rough or Smooth Plaster or Canvas—S-W Flat-Tone Cream.
Wall—Rough or Smooth Plaster or Canvas—S-W Flat-Tone Buff.
Frieze, Background—S-W Flat-Tone System Effect No. 1, produced over Flat-Tone Ivory with Glaze Color Scarlet Orange.
Stencil No. 47—Leaves produced with S-W Flat-Tone Glaze Colors, Italian Pink 1 part, Cobalt ½ part and Stencil White 1 part. Fruit and Mask produced with Italian Pink 1 part, Florentine Lake 1-10 part and Stencil White 2 parts.
Woodwork—Birch—S-W Flat-Tone White and Enamel Ivory.
Floors—Oak Natural—Filled with S-W Transparent Filler and finished with S-W Mar-not.

Page 33, Plate 2

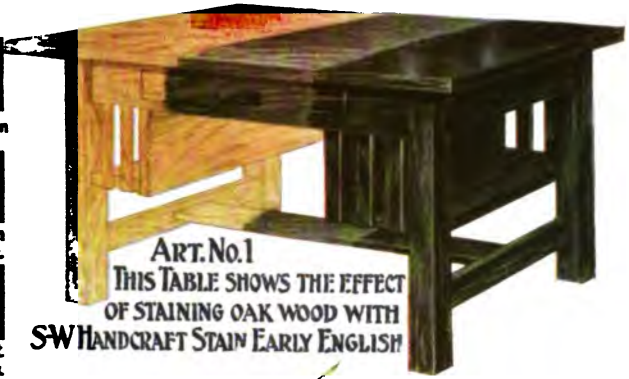
Ceiling—Rough or Smooth Plaster or Canvas, S-W Flat-Tone Lichen Gray.
Wall—Rough or Smooth Plaster or Canvas, S-W Flat-Tone Maple Green.
Stencil Frieze, Stencil No. 13, applied in S-W Flat-Tone Lichen Gray over the Wall Color and the rich peacock tones shown on the sketch produced with Flat-Tone Glaze Colors, Cobalt, Alizarin Green, Burnt Sienna and Raw Sienna.
Woodwork—Oak, stained with S-W Handcraft Stain Old English Oak, followed by S-W Golden Oak Filler and S-W Excello.
Floors—Oak, filled with S-W Golden Oak Filler and followed with S-W Mar-not Varnish.

FURNITURE AND FLOORS CAN BE PROPERLY FINISHED WITH S-W MATERIALS

S-W Golden Oak Stain

S-W Handcraft Stain Old English Oak

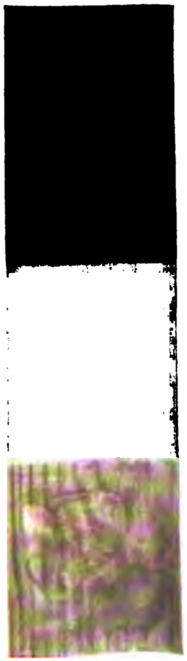
S-W Handcraft Stain Tavern Oak



ART. No. 1 THIS TABLE SHOWS THE EFFECT OF STAINING OAK WOOD WITH S-W HANDCRAFT STAIN EARLY ENGLISH

No. 2 S-W MARNOT VARNISH

No. 3 S-W FLOOR-LAC LIGHT OAK



No. 4 S-W INSIDE FLOOR PAINT GRAY

Sherwin-Williams Products

Paints, Colors, Etc.

Aluminum Paint.
American White.
Auto Leather Dressing.
Bath Enamel.
Bicycle Enamel, Air-Drying.
Bras-Brite.
Brighten Up Finishes.
Brighten Up Stain.
Bronzing Liquid.
Buggy and Auto Paint.
Carbolic-ol
Cement and Stucco Stains.
China Gloss White, SWP.
Combination Whites.
Commonwealth Barn Red.
Commonwealth Barn Gray.
Concrete Finish.
Concrete Sealer.
Copper Paint.
Crack and Seam Filler.
Creosote Paint.
Dancing Floor Wax.
Deco-Paste.
Decotint Wall Finish.
Decotint Wall Colors.
Distemper Colors (Fresco).
Drier, English Patent.
Dry Colors.
Ebonol.
Empress Liquid Gold.
Enamel Leather Dressing.
Enameloid.
Enamel.
English Patent Drier.
English Venetian Red (Paste).
English Vermilion (Dry).
Family Paint.
Filler (Paste).
First Quality Oil Colors.
Flat Black.
Flat Brick Red.
Flat White, SWP.
Flat-Tone (Liquid).
Flat-Tone Glaze and Stencil Colors.
Flat-Tone Glazing Liquid.
Flaxoap.
Floor Finishes.
Floorlac.
Floor Wax.
Floor Wax, Dancing.
Floorwipe.
Fluid Wax, High Polish.
French Crown Green, SWP.
French Crown Green (Paste).
French Zinc in Varnish.

Paints, Colors Etc.—*Continued*

Galvanized Iron Primer.
Glaze and Stencil Colors.
Glazing Putty.
Gloss Colors.
Gloss Whites, SWP.
Gold Paint and Gold Enamel.
Golden Oak Stain.
Graining Colors (Prepared in Oil and in Distemper).
Graining Preparation.
Graphite Pipe Joint and Gasket Compound.
Graphite (Black Lead).
Handcraft Stains.
High Polish Fluid Wax.
Imperial Gold Enamel (Lustroline).
Inside Floor Paint.
Inside Varnish White, SWP.
Kalso.
Linseed Oil (Medicinal).
Linseed Oil Soap
Liquid Gold.
Lustroline Imperial Gold Enamel.
Machine Paint and Filler (Paste).
Medicinal Linseed Oil.
Metalastic No. 2.
Metalastic No. 4.
Metallic Brown (Paste).
Metallic Brown, SWP.
Mine, Mill and Factory Colors.
Moss Green, SWP.
Non-Corrodible Graphite Paint.
Ochre (Paste).
Oil Colors.
Oil Stain.
Old Dutch Enamel.
Old Dutch Process White Lead.
Outside Gloss White, SWP.
Paint and Varnish Remover.
Paste Colored Paint.
Paste Filler.
Perfect Method System for Carriage Painting.
Permanent Cardinal Red, SWP.
Permanent Mahogany Stain No. 700.
Permento.
Polish-ol.
Porch and Lawn Furniture Enamel.
Porch and Deck Paint.
Powdered Floor Wax.
Prepared Graining Colors.
Primer, Gray and Yellow, SWP.
Quick-Drying Colors.
Quick-Drying Colors. Tubes.
Red Lead (Paste).
Roof and Bridge Paint.
Schoolboard Slating.

Sherwin-Williams Products

Paints, Colors, Etc.—*Continued*

Screen Enamel.
Sheep Marking Liquid.
Shingle Stains, Preservative.
SWP.
Special Colors (Paste).
Stencil Colors.
Stencil Outfits.
Stencils.
Stove-Pipe and Iron Enamel.
Taxite (Paint and Varnish Remover).
Tire-Coat.
Venetian Red.
Verdelite.
Wagon and Implement Paint.
White Lead (Paste).
White Zinc (in Oil).
Whites, SWP.
Woodcraft Stains.
Wood Crack Filler.
Yellow Ochre (Paste).
Zincs in Oil, White.
Zinc in Varnish, French.

Carriage Varnishes

Carriage Body Finishing.
Elastic Gear Finishing.
Extra Pale Body Rubbing.
Extra Pale Express Coach.
Gear Rubbing.
Hard-Drying Gear.
Medium Body Rubbing.
Medium Drying Gear.
One Coat Carriage.
Pale Quick Rubbing.
Palest Durable Body.
Palest Perfection Gear.
Quick Rubbing.
Wagon Coach.
Wearing Body Finishing.
White Body Finishing.
White Body Rubbing.
White Gear Finishing.

Master Painters' Varnish Specialties

Durable Spar.
Excello.
Hard-Drying Seat.
Hard-Drying Floor.
High Gloss Interior.
Interior Coach.
Kopal.
Lustral Coach.

Master Painters' Varnish Specialties—*Continued*

Marine Spar.
Mar-not.
No. 5 Exterior.
No. 5 Floor.
No. 5 Interior.
Pale Flowing Cabinet.
Pale Interior Polishing.
Pale Durable Interior.
Transparent Floor.

Asphaltums

Finest Turpentine.
No. 1 Asphaltum.
Premo Asphaltum.

Miscellaneous Varnishes

Bar-Top Finish.
Crystal Paper.
Durable Household.
Durable Linoleum Finishing.
Durable Wood Finish (Exterior).
Durable Wood Finish (Interior).
Extra Furniture.
Extra Boat.
Finest White Damar.
Finest White Enamel.
Hard-Drying Oak.
Hard Oil Finish.
Hard Oil Finish Pale.
Marine.
No. 1 Coach.
No. 1 Damar.
No. 1 Furniture.
Premo Coach.
Premo Furniture.
Premo Hard Oil.
Velvet Finish.

First-Coaters and Liquid Fillers

Hard-Drying Coater.
Liquid Filler.
Marvelac-er.
Mission-lac.
Shellac-coat.
Shellacine.
Wall Size.

Shellacs

White.
Orange.

Sherwin-Williams Products

Driers

- B Drier.
- Dry-o-lene.
- Dry-o-nite.
- Hercules.
- Japan.
- Oxolene.
- White Japan.

Japans

- Coach Painters'.
- Drying.
- Gold Size.
- Imperial Coach.

Insecticides

- Arsenate of Lead, New Process (Paste).
- Arsenate of Lead, Dry Powdered.
- Arsenite of Zinc, Dry.
- Bordeaux Mixture.
- Cattle Dip No. 15.
- Fungicides.
- Insecticides.
- Lime-Sulfur Solution.
- Lime-Sulfur Dip.
- New Process Arsenate of Lead.
- Paris Green (Dry).
- Pruning Compound.

SW
COVER
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EARTH

THE SHERWIN-WILLIAMS CO.

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CHICAGO, Pullman Station
NEWARK, Brown Street and Lister Avenue
MONTREAL, 897 Centre Street
LONDON, ENGLAND

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BINGHAMTON, N. Y., 115 Court Street
BIRMINGHAM, 2309-2311 Morris Avenue
BOSTON, 11-13-15 Stillings Street
BUFFALO, 66-68 Erie Street
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CHICAGO, City Service Station, 2355-57 La Salle Street
CINCINNATI, 420 Pioneer Street
COLUMBUS, 16-20 East Chestnut Street
DALLAS, 2411 Swiss Avenue
DENVER, 1628 Glenarm Place
DETROIT, City Service Station, 138-140 Bates Street and
Wholesale Warehouse, 475 Trombley Avenue
FORT WORTH, Texas, 700 Houston Street
HOUSTON, 622 Travis Street
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SAN ANTONIO, 101 East Commerce Street
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SEATTLE, 512 First Avenue, South
SPOKANE, Corner Railroad Avenue and Wall Street
ST. LOUIS, Second and Clinton Streets
TORONTO, 86 York Street
VANCOUVER, 827 Powell Street
WINNIPEG, Corner Vincent and Whyte Avenue

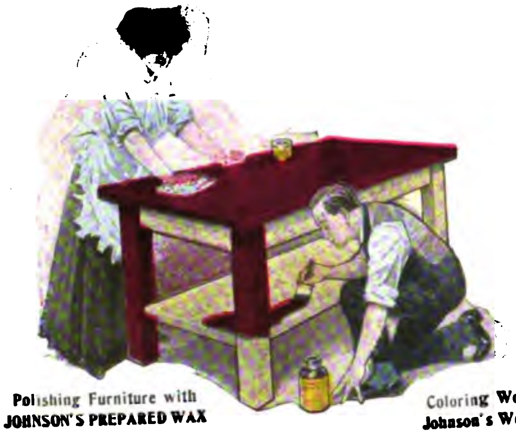
Designed and Printed by the Advertising Department of
THE SHERWIN-WILLIAMS CO.

9

Johnson S.C. & son
Racine,

THE PROPER TREATMENT
For FLOORS WOODWORK & FURNITURE

S.C. JOHNSON & SON
RACINE, WISCONSIN
"THE WOOD FINISHING AUTHORITIES"



Polishing Furniture with
JOHNSON'S PREPARED WAX

Coloring Wood with
Johnson's Wood Dye

Foreword

Wood finished in a perfect and artistic manner is the foundation of all pleasing interiors—this you know.

Do you also know that with Johnson's Artistic Wood Finishes perfect results are always assured? There are no other finishes like them.

It is because of the lack of proper finishes and the general need of them, that we spent over $150,000 producing a line of wood finishes that would give the most beautiful and lasting effects under every condition.

The results we obtained through these costly experiments and our twenty years' experience have made us "The Wood Finishing Authorities," a reputation which we cherish with particular pride.

Manufacturers of Fine Hardwood Flooring for Over 25 Years

It was logical that we should bring about the perfection of wood finishes—we have been manufacturing fine hardwood flooring on an extensive scale for over twenty-five years.

Our flooring is the standard of leading architects and builders all over the country. To specify Johnson's flooring is to ask for the finest quality.

But after furnishing beautiful flooring we found that its beauty was usually marred by the application of poor finishes. All of these finishes were either prepared on the wrong principle or were made of such materials as could not possibly bring about the desired results. So, as a matter of self-protection we took up the study of finishing wood.

We know—because we are authorities on wood as well as their finish—how woods should be finished to bring out their natural beauty We know how to bring out the possibilities of every variety of hard and soft wood in a way that will not only enhance the natural beauty but will also give permanent protection.

Thus the perfection of Johnson's Artistic Wood Finishes has been the work of years. You get the benefit of our experience—of our money expenditure—of our knowledge of what constitutes beauty in wood finish—of our knowledge of woods.

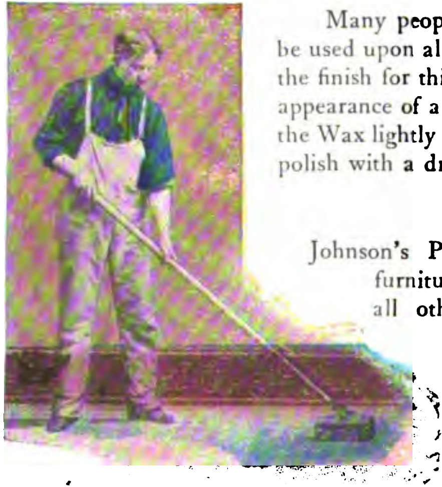
As every one of our products bears the Johnson name, all are fully guaranteed to protect the Johnson reputation—to give perfect satisfaction.

Johnson's Prepared Wax

JOHNSON'S PREPARED WAX is in paste form, for polishing all new and old woodwork, furniture and floors. A light coat should be applied with a cloth over any finish—varnish, shellac or wax. It dries in ten or fifteen minutes so it can be brought to a beautiful, artistic, lustrous polish, with a dry cloth or stiff bristle brush, similar to the brushes used for polishing shoes.

Johnson's Prepared Wax contains *twenty per cent more* of the hard, expensive polishing wax than other waxes on the market. For this reason it will cover *one-fifth more space* and will never soften in warm weather or in hot climates, thereby catching dust and dirt. It can be brought to a more beautiful and lasting polish and kept in perfect condition with least care.

Johnson's Wax Finish will not show scratches or heel-prints, and whenever any part of the finished surface becomes worn—such as door-ways, stair-treads and passages—all that is necessary is the re-waxing of the worn spots. The new finish blends perfectly with the old; in fact, Johnson's Prepared Wax becomes perfectly united with the wood itself.



Many people do not know that Johnson's Prepared Wax should be used upon all woodwork and furniture, including pianos. It is just the finish for this purpose. It will brighten and greatly improve the appearance of all furniture, no matter how finished. Simply apply the Wax lightly with a cloth—wait a few minutes and then bring to a polish with a dry cloth.

Mission Furniture

Johnson's Prepared Wax is the only proper finish for mission furniture. An occasional application will keep mission and all other furniture in perfect condition. Johnson's Prepared Wax should also be used on dining room tables. It is very easy to use. The housewife herself can easily apply it. Simply spread the Wax on lightly with a cloth and in a few minutes polish with a dry cloth or brush.

Johnson's Black Wax

Johnson's regular Prepared Wax is colorless and may be successfully used everywhere except over the very darkest Dye and Stains.

For this purpose we recommend Johnson's Black Wax, with which there is no possibility of the Wax showing light if a little is carelessly left in the corners, carvings or crevices. Johnson's Black Wax is exactly the same as the regular wax except the color.

Johnson's Prepared Wax for Floors

Johnson's Prepared Wax is the only proper finish for floors, as it will not show scratches or heel-marks and can be easily kept in perfect condition. To get the best results upon floors a weighted brush should be used for polishing the Wax. It requires no experience to use Johnson's Prepared Wax and obtain perfect results. Full instructions for finishing new floors are given on page 21.

Other Uses for Johnson's Prepared Wax

Johnson's Prepared Wax may also be used for polishing leather surfaces, such as handbags, leather cushions, shoes, etc.

Johnson's Prepared Wax should be used for polishing and finishing metal such as brass, nickel, polished steel, etc.

Johnson's Prepared Wax is invaluable for use on bookkeepers' and other desks where heavy books are used. The Prepared Wax makes a surface on which the books may be easily slid around, thus obviating the necessity of lifting them.

Johnson's Prepared Wax should be used as a lubricant upon drawers which do not open and close easily. Apply the Wax on the edge of the drawer and when dry polish it with a cloth.

One pound of Johnson's Prepared Wax is sufficient for 250 square feet, one coat.

Painters and **wood finishers** who are not familiar with our line should write us for samples of the Prepared Wax, Wood Dye, Under-Lac, Flat Wood Finish, etc., and also for panels of different woods treated with these finishes. Take advantage of the service offered free by our painters' department. Tell us your wood finishing troubles. All correspondence from painters and practical men is given prompt and careful attention.

All of Johnson's preparations are for sale by leading dealers in paint, hardware and drugs. If your local dealer won't procure our goods for you, we will supply you.

Johnson's Powdered Wax

As the name implies, Johnson's Powdered Wax is in powdered form for all dancing floors. It does not cake or harden and is easily and quickly applied. Simply sprinkle the Wax lightly over the floor, and the feet of the dancers will spread it, polishing the floor and making a perfect dancing surface. It is put up in three sizes, in enamel tin cans with perforated tops. Use Johnson's Powdered Wax sparingly.

One of the excellent features of Johnson's Powdered Wax is that it is free from dust, which every dancer finds not only annoying, but decidedly uncomfortable, unhealthful, and ruinous to clothing.

Johnson's Powdered Wax is of exactly the proper consistency; it has just slip enough and not one bit too much. It is not necessary to use a large amount of Johnson's Powdered Wax; sprinkle it on very lightly—a large size can contains enough for 10,000 square feet.

Dancing floors which are in good condition should be swept and a coat of Powdered Wax applied, but a few minutes' time being required for the largest floor. All dancing floors can be kept in perfect condition by sprinkling a little clean white sand on the floor during the last dance. This will have the same effect as sandpapering the floor. After the dance is over the floor should be brushed up and before using it again for dancing a light application of Johnson's Powdered Wax is necessary.

We have had such a large demand for our Powdered Wax in large containers that we have decided to put it up in Club size packages. This size contains more than twenty-five of the regular 50-cent packages. We put it up in this size particularly for dancing masters, managers of dancing pavilions, clubs, etc., where a large quantity is used during the season.. The Club size is listed at $10.00 each.

Instructions for Finishing New Ball Room Floors

A new ball room floor which has never been finished should be first given a coat of Johnson's Paste Wood Filler and then a coat of Johnson's Prepared Wax, polishing the latter well with a weighted brush. Wait a day or two for the finish to harden thoroughly and the floor is then ready for dancing and may be easily kept in perfect condition by an occasional application of Johnson's Powdered Wax.

Johnson's Kleen Floor

Johnson's Kleen Floor should be used for keeping all finished floors in perfect condition. It makes no difference how they are finished—whether in varnish, shellac oil or wax—Johnson's Kleen Floor should occasionally be used to keep them bright and clean. With a bottle of Johnson's Kleen Floor and a can of Prepared Wax the usual bugbear of keeping hardwood floors in good condition is entirely overcome.

Meets Every Demand

Johnson's Kleen Floor is very easy to use. All that is necessary is to apply it to the soile portions of the floor with a cloth and rub well. It will immediately remove all spots, stains discolorations, water-marks, etc., putting the floor in perfect condition to receive a new coa of finish.

For deep-seated stains which have penetrated into the wood, pour on the Kleen Floo and rub with excelsior or a stiff scrubbing brush. Under no circumstances use steel wool or your floors, as it will leave dark, metal-colored spots which it will be almost impossible t remove.

After cleaning the floor thoroughly with the Kleen Floor, wipe it just as dry a possible with a cloth and in an hour or two apply a coat of Johnson's Prepared Wax in th usual manner—the floors will be as bright and clean as new.

Floors Cleaned and Waxed Within an Hour

One of the greatest advantages of Johnson's Kleen Floor is the fact that it works quickly The furniture may be moved out of the room, the floors cleaned with Johnson's Kleen Floo and polished with Prepared Wax, the rugs cleaned and laid, and the furniture replaced—al in the space of an hour or two.

For Cleaning Woodwork and Furniture

Johnson's Kleen Floor is also unexcelled for cleaning woodwork and furniture. Use th same as upon floors.

Do not allow your dealer to sell you anything except Johnson's Kleen Floor for cleanin floors, woodwork and furniture, and keeping them in perfect condition. If your painter o house-man is not familiar with Johnson's Kleen Floor ask him to drop us a card and full information will be furnished.

One-half gallon of Johnson's Kleen Floor is sufficient for cleaning 350 square feet.

Johnson's Under-Lac

Johnson's Under-Lac is a liquid preparation superior to shellac or varnish. We recommend its use everywhere that shellac or varnish would ordinarily be used.

Johnson's Under-Lac is a thin, elastic, transparent spirit varnish which has all of the advantages of shellac and varnish and none of the disadvantages of either.

Johnson's Under-Lac is much easier to use than shellac or varnish. Shellac dries so quickly that it is very hard to spread, making it difficult for inexperienced persons to use it successfully. On the other hand, varnish dries very slowly, so much so that it gathers dust and dirt long before it hardens.

If Under-Lac becomes thick from standing it can easily be thinned by adding a small quantity of wood or denatured alcohol.

Under-Lac for New Work

Under-Lac gives equal satisfaction on floors, woodwork or furniture. It should be applied on the bare wood for a natural, inexpensive finish, or over Wood Dye or Paste Wood Filler where a higher gloss than a waxed finish is desired. For a varnish finish apply a coat of good varnish over the Under-Lac. It is unsurpassed for a first coat under varnish, holding up the varnish much better than shellac does.

For Linoleum and Oilcloth

Johnson's Under-Lac is the only proper finish for linoleum and oilcloth. Take an old, dim, dull surface and give it a coat of Under-Lac and it will be as bright as new. A coat of Under-Lac will furthermore add greatly to the wearing qualities of the linoleum. It will dry hard in an hour so the floor may be walked upon—this makes it particularly desirable for finishing linoleum in kitchens, dining rooms, bath rooms and other rooms that are in almost constant use.

We never recommend the use of more than one coat of Under-Lac at a time, as the second coat softens the first. After the first coat has become worn, however, another coat may be applied without first removing the old coating.

Johnson's Under-Lac

To Brighten Up Old Furniture

Almost every household has old furniture that has been in use for a great many years which is not discarded because of some sentiment or because it would seem like parting with an old friend. The appearance of this old furniture can be greatly improved by giving it a coat of Johnson's Under-Lac. We recommend the use of Under-Lac for all old furniture except where it has a heavy coating of varnish or some other finish, but where the old finish is thin or almost entirely worn off Under-Lac will give splendid results.

If you desire to change the color of the wood as well as brighten it up, apply Johnson's Wood Dye first and when this dries, a coat Under-Lac.

Where furniture has a heavy coating of old finish which is very much scratched and wo the only way that it can be refinished is to entirely remove the old, worn, scratched finish. T can be easily accomplished with Johnson's Electric Solvo, which is described on page 12. F instructions for refinishing old furniture are given on page 28.

The best brush to use for applying Johnson's Under-Lac is a 2 inch or 2½ in fitch brush.

The fact that Johnson's Artistic Wood Finishes, particularly Under-Lac, Filler, F Wood Finish, Wood Dye and Prepared Wax, are becoming standard among furniture mar facturers, is convincing proof of their high quality, as this class of trade is generally concec to be the hardest to satisfy.

One gallon of Johnson's Under-Lac is sufficient for 500 square feet.

Ask your painter to show you panels of wood finished in different effects with Johnso Wood Dye, Paste Wood Filler, Under-Lac, Flat Wood Finish, etc. These will be a gre assistance in deciding definitely upon the finish for new work.

If your painter is not acquainted with this line of wood finishes, ask him to write us a we shall be glad to give him full information. We have a very large department which devo its entire time to correspondence with painters, contractors, etc. We want every painter a wood finisher to take advantage of the service offered by this department. It is absolut free—there is no obligation of any kind connected with it.

Our finishes are for sale by all leading paint, drug and hardware stores. If your lo dealer does not carry our finishes in stock, and is unwilling to order for you, send in your mittance direct to Racine and we will see that you are promptly supplied, prepaying the frei charges (not express) on orders amounting to $3.00 or more to all points in the United Sta east of the Mississippi River.

We have a list of over five hundred distributors of our line. Write us for a copy if y dealer is not handling these goods.

Johnson's Flat Wood Finish

We recommend the use of Johnson's Flat Wood Finish for that beautiful, velvety, flat effect without the expense of rubbing. It is a liquid preparation and should be applied with an ordinary varnish brush. For use upon all woodwork and furniture but not for floors.

For New Work

Johnson's Flat Wood Finish should be applied over Wood Dye or Paste Wood Filler. It dries in three or four hours, giving a perfectly flat effect. Our Flat Wood Finish has enough body so that it may be rubbed if desired in twenty-four or forty-eight hours to a semi-gloss or egg-shell finish.

If a heavier body is desired than that obtained by the stain or filler and Flat Wood Finish, apply a coat of Under-Lac under the Flat Wood Finish.

For hardwoods only one coat of Flat Wood Finish is required, and under ordinary circumstances a single coat is sufficient for softwood, but when finishing very soft, porous woods it may sometimes be necessary to apply two coats in order to secure best results.

With Johnson's Flat Wood Finish it is possible for everyone to secure the artistic, flat effects. Many people prefer the flat finish but heretofore have not felt that they could afford it owing to the expense of rubbing. Now by using Johnson's Flat Wood Finish the same effect can be obtained at one-third the cost of the labor on a rubbed-varnish job.

For Old Work

Old highly varnished woodwork and furniture may be greatly improved and made to correspond with new pieces of furniture by applying a coat of Johnson's Flat Wood Finish right over the varnish. It will dry in a few hours, imparting an artistic, up-to-date effect.

Johnson's Flat Wood Finish is a boon to painters and wood finishers. It is now possible for them to secure every contract on which they bid, at the same time giving their customers a beautiful, satisfactory, durable, hand-rubbed effect, and make a good profit besides.

One gallon of Johnson's Flat Wood Finish is sufficient for 500 square feet.

Johnson's Crack Filler

Johnson's Crack Filler, paste form, is for filling cracks and crevices in floors and woodwork which are to be finished natural or with Johnson's Wood Dye. Be sure to remove all foreign matter from the cracks and see that the boards are nailed down tightly, then fill the cracks with Johnson's Crack Filler, using an ordinary putty knife.

When using Crack Filler on very dry or porous wood we recommend that the cracks be first given a light coat of linseed oil, otherwise the dry wood will absorb all the oil in the Crack Filler before it has a chance to harden, and the result is that the Filler will crumble.

Johnson's Crack Filler is made in one shade only—a deep cream. It hardens in twenty-four hours so that the work may be finished. If Johnson's Wood Dye is to be used for finishing we suggest that the Crack Filler be colored slightly with the same shade of Dye that is to be used upon the work, then when it hardens the Dye should be applied to the entire work and the Crack Filler will take the Dye the same as the wood itself.

One pound of Johnson's Crack Filler is ordinarily sufficient for 30 square feet, but of course if the cracks are unusually large and deep more will be required.

Johnson's Plasto-Filler

We have had some demand for a cheaper preparation than our Crack Filler, particularly for filling cracks in old, softwood floors which are to be painted. For this purpose we recommend Johnson's Plasto-Filler, which can also be used successfully for all iron and stone work, and for supplying the missing parts of carved and ornamental work of all kinds. It can be sawed or carved. Plasto-Filler should also be used for filling cracks and crevices in walls before papering, painting or tinting.

Johnson's Plasto-Filler is very easy to use. It comes in powdered form—simply mix it with water and it is ready to use. It dries rock-hard in two hours so the work may be finished. It never shrinks, swells or cracks.

Johnson's Plasto-Filler is considerably cheaper than the Crack Filler, as it costs less and one pound will go twice as far.

Johnson's line of wood finishes is handled by all the leading paint, hardware and drug dealers. If your local dealer hasn't what you want in our line and is unwilling to order for you, send in your order and remittance direct to Racine and we will see that you are promptly supplied, prepaying the freight charges (not express) on orders amounting to $3.00 or more to all points in the United States east of the Mississippi River.

Johnson's Electric Solvo

Johnson's Electric Solvo is for softening all old finish—paint, varnish, shellac, etc., so that it may be easily removed and the wood refinished.

Johnson's Electric Solvo is in liquid form. Sometimes in very cold weather the paraffine in the Electric Solvo hardens and the preparation becomes a semi-liquid. This can be easily remedied by placing the can of Electric Solvo in a pail of hot water. Do not place the Electric Solvo on the stove to soften it, and do not open the can in a room in which there is an open fire or blaze.

The New Finish Always Dries

The new finish always dries when the old finish has been removed with Johnson's Electric Solvo. This is because our preparation contains a very small percentage of paraffine wax—smaller than all other removers on the market. One gallon of some varnish removers contains enough paraffine to prevent many gallons of new finish from drying properly.

Electric Solvo Has Many Uses

After painting a house the windows are usually bespattered; an application of Johnson's Electric Solvo will clean them more easily and quickly than anything else. It is also fine for softening old putty in windows.

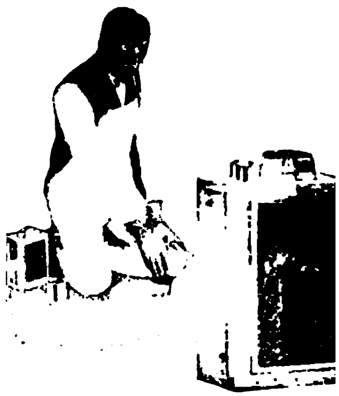
Johnson's Electric Solvo should be used on the outside of buildings before repainting to remove paint which has blistered and partly peeled off. It is very necessary that this old paint be thoroughly removed so that the new coating will adhere properly.

Many of our customers have used Electric Solvo for removing paint spots from clothing, and report it admirable for this purpose.

It is used largely by painters for softening their paint and varnish brushes and keeping them in good condition.

Johnson's Electric Solvo will not injure the hands or the finest fabrics, and is free from any disagreeable odors; it softens the old finish quickly without injuring the wood in the slightest.

Johnson's Floor Finish No. 1



We recommend Johnson's Floor Finish No. 1 for floors which receive hard treatment and must be frequently scrubbed with soap and water, such as kitchen, pantry, bath-room, store, office and school-room floors.

Such floors require a finish which will be partly absorbed by the wood itself, so that it will be properly protected. If a finish is used which remains on the surface only, it will soon become worn and scrubbed off, leaving the wood bare, unsightly and unprotected.

Johnson's Floor Finish No. 1 is more of a floor dressing than a floor finish. It penetrates into the wood, preserving it and preventing it from becoming soft and gray under the constant action of water, soap and strong washing compounds. It also prevents dirt and grease from being absorbed by the wood.

For New Floors

We recommend that new floors of this character be first given a coat of Johnson's Natural Paste Wood Filler No. 10, and then an application of Floor Finish No. 1. Subsequent coats of Floor Finish may be applied as required.

Johnson's Floor Finish is very simple to use. Cleanse the floor with soap and water and when it is dry apply the Floor Finish with a cloth or an ordinary varnish brush.

For Old Floors

Caution: Do not apply Johnson's Floor Finish No. 1 over a heavy coating of varnish, shellac, liquid filler or oil, as the finish already on the wood will prevent the Floor Finish No. 1 from penetrating. This old finish should all be removed with Electric Solvo and the wood refinished with Paste Wood Filler and Floor Finish No. 1.

One gallon of Floor Finish No. 1 is sufficient for 600 square feet.

Johnson's preparations are used largely by leading painters and wood finishers. Architects, contractors and painters should write us for details on our method of finishing wood. We shall be glad to send them a beautiful portfolio showing different effects on the actual woods.

Ask your painter to show you finished wood panels treated with Johnson's Artistic Wood Finishes. If he hasn't them we shall be glad to supply him upon request, free and postpaid.

The Johnson Wood Finishes are for sale by the best paint, hardware and drug dealers and jobbers everywhere. Insist upon your local dealer supplying you. If he hasn't the goods in stock he can easily procure them for you through his jobber. If your dealer is unwilling to order our goods for you send in your order and remittance direct to Racine and we will see that you are promptly supplied, prepaying freight (not express charges) on orders amounting to $3.00 or more to all points in the United States east of the Mississippi River.

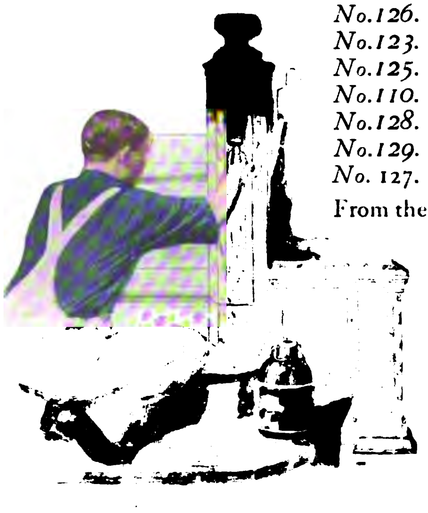
Johnson's Wood Dye

Most woods require color to bring out the beauty of their grain. It is also true that wood finished in its natural color cannot be worked as successfully into color schemes of decoration as when it is finished in color. For these reasons we manufacture a line of wood colors known as Johnson's Wood Dyes. Our Wood Dye is entirely different from the many wood tints and stains on the market. It should not be confused with varnish stains which remain on the surface, giving a cheap looking, painty effect which shows every scratch and heel-print.

Johnson's Wood Dye is a dye in every sense of the word. It penetrates deeply so that the natural color of the wood is not disclosed when scratched or marred; it brings out the beauty of the grain without raising it in the slightest; it dries in a half hour and does not rub or smudge off; it does not contain any finish whatever—the finish must be applied over it

Johnson's Wood Dye is made in sixteen standard shades as follows:

No.120. Fumed Oak.
No.126. Light Oak.
No.123. Dark Oak.
No.125. Mission Oak.
No.110. Bog Oak.
No.128. Light Mahogany.
No.129. Dark Mahogany.
No. 127. Ex. Dark Mahogany.
No.130. Weathered Oak.
No.131. Brown Weathered Oak.
No.132. Green Weathered Oak.
No.121 Moss Green.
No.122. Forest Green.
No.140. Early English.
No.172. Flemish Oak.
No. 178. Brown Flemish Oak.



From these sixteen shades hundreds of other shades may be easily obtained by lightening, darkening or mixing. To lighten any shade add wood or denatured alcohol; to darken add No. 172 Flemish Oak Dye, which is jet black. Two or three shades may also be mixed together, for instance, if you wish a shade of mahogany a little more on the brown than our shades, simply add a little of the No. 125 Mission Oak Dye to the No. 128 Light Mahogany and you can make it just as brown as you wish.

Johnson's Wood Dye

This fact must be taken into consideration—all shades of the dye show darker on soft woods than they do on hardwood, for the reason that the soft wood absorbs more of the dye than the hard and thus a darker shade is produced. Always try the dye first upon a small piece of the same kind of wood upon which it is to be used, then if it is not the right shade it can be lightened or darkened according to the instructions given on the previous page, or another shade can be used.

The Proper Method of Coloring Wood

The proper way to color wood is to apply Johnson's Wood Dye upon the bare wood; then it can penetrate into the wood, while if the wood has first been given a coat of filler or finish it is impossible for the dye to perform one of its chief functions—to penetrate. Johnson's Wood Dye should always be applied with a soft brush. We recommend 2 inch camels-hair brush.

After the wood has been dyed it is ready for the finish. Full instructions for finishin wood are given on pages 21 to 26 of this booklet.

For Baskets

Johnson's Wood Dye is the proper finish to use on reed baskets. The shades best adapte for this work are the browns, greens and mahoganies. Over the stain either Under-Lac o Flat Wood Finish should be applied—the Under-Lac for a gloss and the Flat Wood Finish fo a dead effect.

If parties **building or remodeling homes** will write us advising what woods they are usin for their floors and interior woodwork and what shades they are interested in for finishing, w shall be very glad to send them—without any obligation whatever—panels of those wood finished in any way they desire. These wood panels will be a great assistance in decidin definitely on the finish for the various rooms.

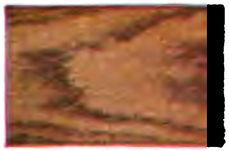
Johnson's Wood Dye is just the thing for coloring Lincrusta Walton and other simila wall coverings. Apply it the same as upon wood. If a coat of Johnson's Flat Wood Finis is applied over the Dye on Lincrusta Walton the effect is perfect. See page 27.

If your painter is not using our Wood Dye and other finishes, ask him to write us. W have a very nice bound folder showing the different shades of dye on the actual woods. Thi can also be used advantageously by contractors, architects and all wood finishers.

One gallon of Johnson's Wood Dye is sufficient for 700 square feet on hardwood an 400 square feet on softwood.

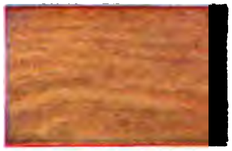
Johnson's Wood Dye

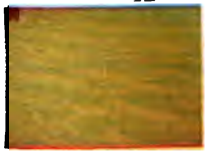
PLAIN OAK


No. 125 Mission Oak

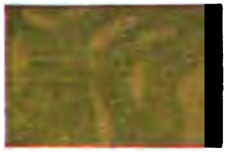
No. 172 Flemish Oak

QUARTERED OAK


No. 123 Dark Oak


No. 121 Moss Green

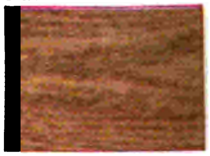
QUARTERED OAK


No. 132 Green Weathered Oak

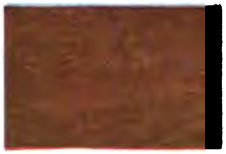
No. 126 Light Oak

PLAIN OAK

No. 132 Green Weathered Oak


No. 120 Fumed Oak

BIRCH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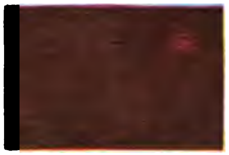
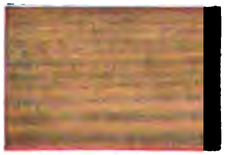

No. 178 Brown Flemish Oak

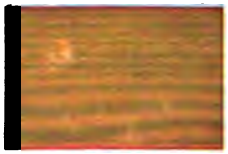
BIRCH

No. 137 Extra Dark Mahogany

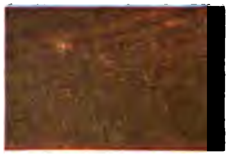
No. 125 Mission Oak

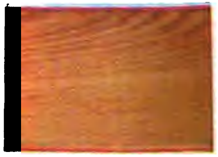
SOUTHERN PINE


No. 130 Weathered Oak


No. 132 Green Weathered Oak

CYPRESS


No. 110 Bog Oak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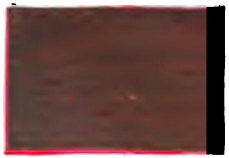
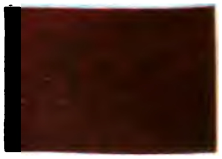
SOUTHERN PINE


No. 127 Extra Dark Mahogany

No. 120 Fumed Oak

CYPRESS

No. 140 Early English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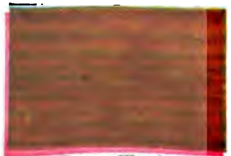
SOUTHERN PINE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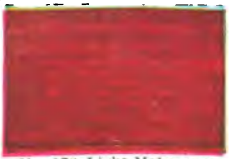
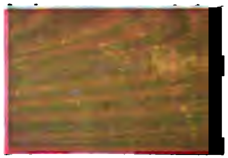

No. 128 Light Mahogany

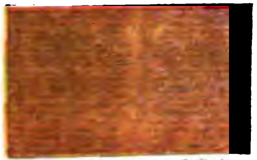
CYPRESS


No. 132 Green Weathered Oak

[illegible] sh Oak

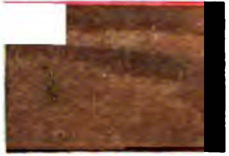
Johnson's Wood Dye

QUARTERED OAK


No. 120 Fumed Oak

No. 178 Brown Flemish

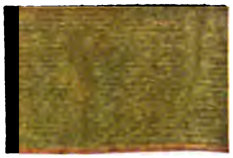
SOUTHERN PINE


No. 140 Early English

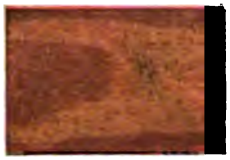
No. 110 Bog Oak

QUARTERED OAK

No. 140 Early English

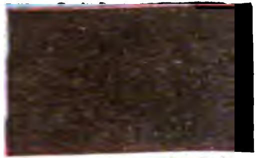

No. 122 Forest Green

SOUTHERN PINE


No. 123 Dark Oak

No. 178 Brown Flemish

QUARTERED OAK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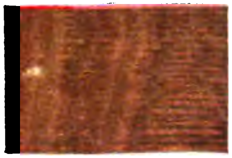
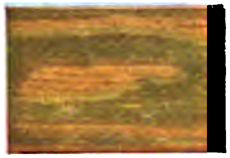
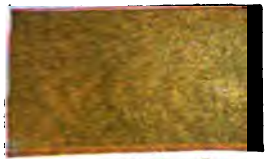

No. 125 Mission Oak

SOUTHERN PINE


No. 121 Moss Green

No. 125 Mission Oak

BIRCH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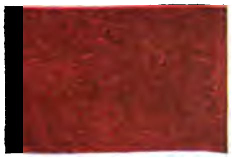
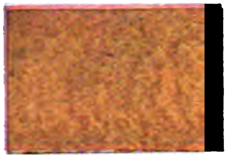
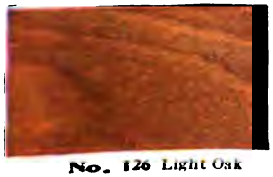

No. 129 Dark Mahogany

BIRCH


No. 126 Light Oak

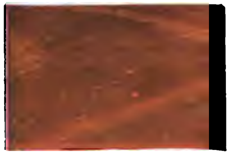
No. 128 Light Mahogany

CYPRESS


No. 126 Light Oak

No. 125 Mission Oak

CYPRESS


No. 131 Brown Weathered

No. 123 Dark Oak

PLAIN OAK

No. Weathered

No. 110 Bog Oak

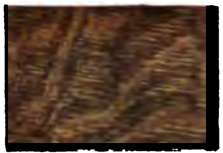
PLAIN OAK

No. 130 Weathered Oak

No. 132 Green Weathered

Johnson's Wood Dye

QUARTERED OAK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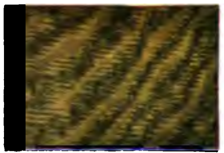
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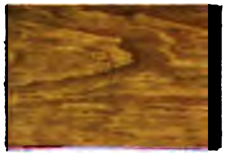
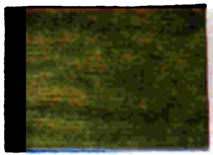
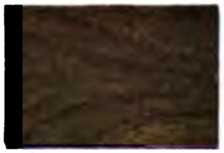
PINE


No. 126 Light Oak


No. 122 Forest Green

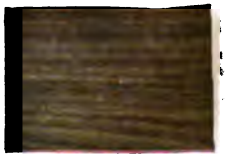
WALNUT

No. 128 Light Mahogany


No. 140 Early English

CYPRESS

No. 110 Bog Oak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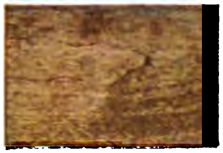
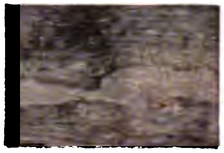
BIRCH


No. 120 Fumed Oak

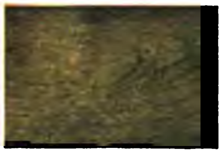

No. 130 Weathered Oak

BIRCH

No. 126 Light Oak

No. 129 Dark Mahogany

BIRCH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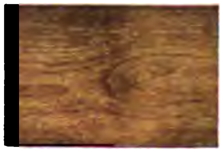
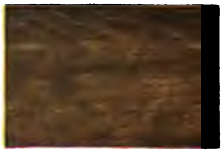
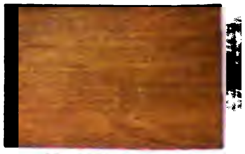
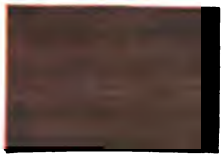

No. 123 Dark Oak

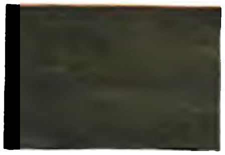
GUM


No. 131 Brown Weathered

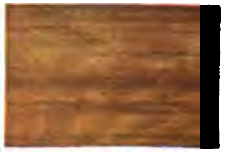

No. 126 Light Oak

GUM


No. 178 Brown Flemish


No. 110 Bog Oak

GUM


No. 120 Fumed Oak

No. 122 Forest Green

GUM

No. 129 Dark Mahogany

No. 140 Early English

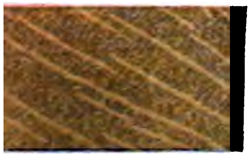
GUM

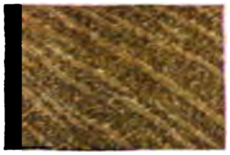
No. 128 Light Mahogany

No. 125 Mission Oak

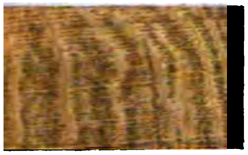
Johnson's Paste Wood Filler

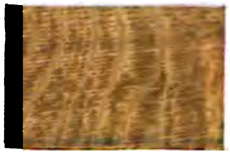
QUARTERED OAK


No. 30 Dark Filler

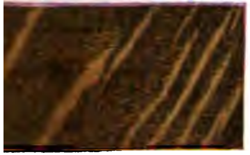

No. 40 Antwerp Filler

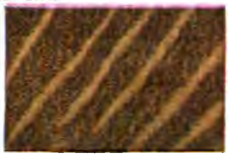
QUARTERED OAK


No. 20 Golden Oak Filler

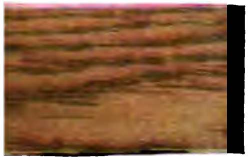

No. 10 Natural Filler

QUARTERED OAK


No. 125 Mission Oak Dye
No. 30 Dark Filler


No. 120 Fumed Oak Dye
No. 20 Golden Oak Filler

PLAIN OAK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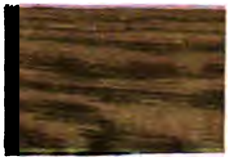
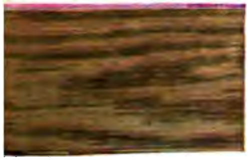
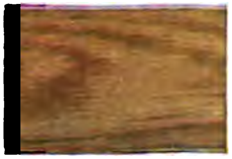

No. 40 Antwerp Filler

PLAIN OAK


o. 20 Golden Oak Filler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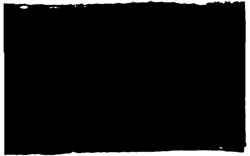
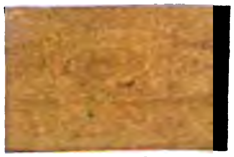
MAPLE


No. 10 Natural Filler

ASH

No. 10 Natural Filler

BIRCH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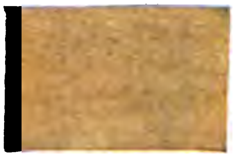
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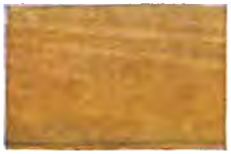
CYPRESS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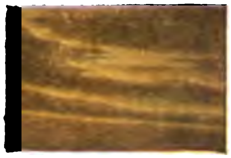
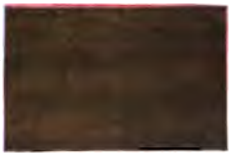

No. 20 Golden Oak Filler

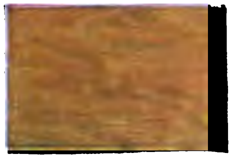
WALNUT

No. 40 Antwerp Filler

MAHOGANY


No 30 Dark Filler

FIR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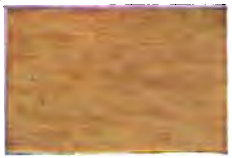
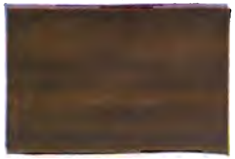
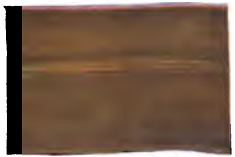

No. 10 Natural Filler

CHERRY

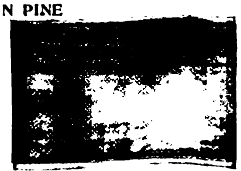

No. 20 Golden Oak Filler

GUM


No. 10 Natural Filler

SOUTHERN PINE

No. 40 Antwerp Filler


No. 10 Natural Filler

Johnson's Paste Wood Filler

Johnson's Paste Wood Filler is for filling the grain and pores of all wood. It is made of the best and most expensive needle-like silex crystals, pure linseed oil and the best Japan dryer. Johnson's Paste Wood Filler penetrates and the crystals fit perfectly into the grain of the wood and hold fast to it; this is because the silex used in our filler is ground from the hard quartz instead of from calcined quartz which most manufacturers use.

Johnson's Paste Wood Filler is entirely different from other brands on the market, which are made from corn starch, whiting, talc, and other cheap materials which when they dry, become loose, leaving the wood worse than before.

Johnson's Paste Wood Filler is put up in cans ready to use in the following shades:

Natural No. 10.	Golden Oak No. 20.
Dark Oak No. 30.	Antwerp Oak No. 40.

Johnson's Paste Wood Filler may be wiped with ease six hours after applying same. It dries rock-hard in twenty-four hours and will not settle or harden in the cans as is the case with other fillers.

Never Use a Liquid Filler

These so-called fillers are nothing but a cheap grade of varnish which put a coating over the wood; they do not penetrate the wood at all, neither do they fill the grain and pores. Liquid Fillers show every scratch and heel-print. In our opinion the poorest grade of paste wood filler on the market is superior to the best liquid filler that can be made.

Johnson's Paste Wood Filler a Great Saver of Finish

A better finish is obtained with one coat of Johnson's Prepared Wax over Paste Wood Filler than with two coats of wax upon the bare wood. This is also true when varnish is used; one coat of varnish over our filler will give better results than two coats of varnish over liquid filler or on the bare wood. Thus Johnson's Paste Wood Filler is a great saver of finish.

Full instructions for finishing new floors and woodwork and for refinishing old work are given in the following pages.

One pound of Johnson's Paste Wood Filler is sufficient for filling the grain of 40 square feet.

Finishing New Floors

Hardwood Floors

FOR A NATURAL FINISH. Apply a coat of Johnson's Natural Paste Wood Filler No. 10 upon the bare wood after it has been thoroughly scraped. Full instructions for the use of the filler are given on the labels. The filler should be allowed to dry from twelve to twenty-four hours and the floors are then ready for the finish.

The proper finish to use over the Filler is two coats of Johnson's Prepared Wax. This should be applied with a cloth or stiff oval brush. It will dry in ten or fifteen minutes and each coat should then be well polished with a weighted brush, which you will find shown and described on this page. The advantages of Wax over other preparations for a floor finish are outlined on pages four and five.

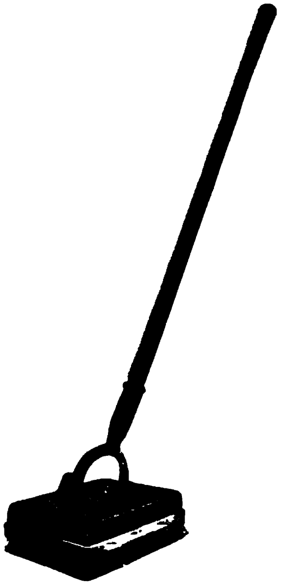
FOR GOLDEN OAK, DARK OAK OR ANTWERP OAK EFFECTS. Apply a coat of one of our colored shades of Paste Wood Filler and then two coats of Johnson's Prepared Wax, polishing each coat well with a weighted brush. Floors finished in this manner can easily be kept in perfect condition.

FOR OTHER SHADES. For all other shades, such as Mahogany, Mission, etc., apply a coat of Johnson's Wood Dye upon the bare wood. This will dry in fifteen or twenty minutes and the floors are then ready to be finished with two coats of Johnson's Prepared Wax. If a filled-grain effect is desired apply a coat of Johnson's Dark Paste Wood Filler No. 30 over the Dye and then two coats of Johnson's Prepared Wax.

We show on this page cut of our new style weighted brush. We strongly recommend this new brush, as it is a great improvement over the old. It is not top heavy and is very much easier to operate. Besides, the brush is considerably larger, so that each stroke polishes a larger surface.

Painters, contractors and architects should write us for a beautiful portfolio which shows on the actual woods many beautiful effects which can be obtained by the use of Johnson's Artistic Wood Finishes. This portfolio will be of great assistance in securing contracts.

Leading paint, drug and hardware dealers everywhere handle our line. If yours cannot supply you ask him to order through his nearest jobber or direct from Racine. If your dealer is unwilling to procure our finishes for you, send in the order to us yourself, and we will see that you are promptly supplied, prepaying the freight charges (not express) on orders amounting to $3.00 or more to all points in the United States east of the Mississippi River.



Finishing New Floors

Softwood Floors

FOR A NATURAL FINISH apply a coat of Johnson's Natural Paste Wood Filler No. 10. Allow from twelve to twenty-four hours to dry and then apply two coats of Johnson's Prepared Wax with a cloth or stiff oval brush. The Wax will dry in fifteen or twenty minutes and each coat should then be well polished with one of our weighted brushes which are described on the preceding page. If a higher gloss is desired apply a coat of Johnson's Under-Lac over the Filler and then one coat of Wax.

FOR COLORED EFFECTS apply a coat of Johnson's Wood Dye, the desired shade, directly upon the wood and over it two coats of Johnson's Prepared Wax. For a higher gloss apply a coat of Johnson's Under-Lac over the Dye and then one coat of Wax. If a filled-grain effect is desired apply a coat of our Dark Paste Wood Filler No. 30 over the Dye and then two coats of Prepared Wax.

Kitchen, Pantry and Bathroom Floors

These floors require a special finish, as they receive hard treatment and must be frequently scrubbed with soap and water. We recommend the use of Johnson's Natural Paste Wood Filler No. 10 upon the bare wood and over this a coat of Johnson's Floor Finish No. 1. Subsequent coats of the Floor Finish No. 1 should be applied as required.

These instructions also apply to school-room, office and store floors.

Porch Floors

The most satisfactory finish for porch floors is a good floor paint. For those who wish to finish their porch floors natural, apply a coat of Johnson's Natural Paste Wood Filler No. 10 and then our Floor Finish No. 1. For a darker effect use the Dark Filler No. 30 instead of the Natural.

Refinishing Old Floors

Hardwood

IF IN FAIR CONDITION. Clean thoroughly with Johnson's Kleen Floor. If the floors are very badly soiled use a stiff bristle scrubbing brush in connection with the Kleen Floor. Then wipe the wood perfectly dry with a cloth and in an hour or two apply a coat of Johnson's Prepared Wax in the usual manner, polishing well with a weighted brush.

IF IN POOR CONDITION. If the finish is very badly scratched and worn it should be entirely removed. This can be easily accomplished with Johnson's Electric Solvo (described on page 12). Be sure to entirely remove the old finish; in this lies the secret of successful refinishing. Then fill any cracks there may be with Johnson's Crack Filler and when this is dry the floor is ready to be refinished as new according to the instructions given on page 21 for finishing new hardwood floors.

Softwood

IF IN FAIR CONDITION. Clean the floor thoroughly with Johnson's Kleen Floor, which you will find described on page 7. After using the Kleen Floor wipe the wood just as dry as possible with a cloth, and in an hour apply two coats of Johnson's Prepared Wax in the usual manner, polishing each coat well with a weighted brush.

IF IN POOR CONDITION. First remove all the old finish with Johnson's Electric Solvo and fill the cracks with Johnson's Crack Filler. The Crack Filler should be colored slightly with the same shade of Dye which is to be used for refinishing. The Crack Filler will harden in twenty-four hours and a coat of the Dye should then be applied with a 2-inch camels-hair brush. Over this we recommend the use of two coats of Johnson's Prepared Wax. For a higher gloss than a waxed finish, apply a coat of Johnson's Under-Lac over the Dye and then one coat of Wax.

Kitchen, Pantry and Bathroom Floors

Floors of this character require a special treatment, inasmuch as they are subject to very rough usage. If the floors have never been finished, fill the cracks with Johnson's Crack Filler. This will dry in from twelve to twenty-four hours; then give the floor a coat of Johnson's Natural Paste Wood Filler No. 10 and a coat of Floor Finish No. 1. Subsequent coats of the Floor Finish No. 1 may be applied as required.

If the floors have already received a coat of finish this should be entirely removed with Johnson's Electric Solvo, then fill the cracks with Crack Filler, the pores of the wood with Paste Wood Filler and apply Floor Finish No. 1.

These instructions apply also to *store*, *office*, *school-room* and other floors which receive hard treatment and must be frequently scrubbed with soap and water.

Refinishing Old Floors

Old, Rough, Uneven Floors

Fill the cracks with Johnson's Plasto Filler. When this has hardened apply a coat of any good floor paint and over this a coat of Johnson's Under-Lac.

Linoleum, Oilcloth, etc.

Clean thoroughly with soap and water and when perfectly dry apply a coat of Johnson's Under-Lac. This will dry within an hour so the floor may be walked upon. A coat of Johnson's Prepared Wax may be applied over the Under-Lac if desired.

Old Ball Room Floors

If in fair condition satisfactory results may be obtained by cleaning the floor with Johnson's Kleen Floor and then giving it a coat of Johnson's Prepared Wax. Polish the Wax well and allow it two or three days to harden. It is then ready for dancing and an occasional coat of Johnson's Powdered Wax should be applied. If the old floor is in very bad condition the only way to refinish it satisfactorily is to remove the old finish with Johnson's Electric Solvo and then refinish the same as a new ball room floor. Instructions are given on page six.

Porch Floors

Fill the cracks with Johnson's Plasto-Filler and then paint them with any good floor paint.

Painters who are not using Johnson's Wood Finishes should write us for samples and wood panels finished in different effects. Painters who are figuring on special work and want panels finished in any particular manner to show clients should write us and we will make up the panels and forward them promptly free and postpaid.

Our line of wood finishes is handled by leading dealers everywhere. If your dealer hasn't our goods in stock and is unwilling to order for you, send your order and remittance direct to Racine and we will see that you are promptly supplied, prepaying the freight charges (not express) on orders amounting to $3.00 or more to all points in the United States east of the Mississippi River.

Finishing New Woodwork

Hardwood

FOR A NATURAL FINISH. Apply a coat of Johnson's Natural Paste Wood Filler No. 10 upon the bare wood. Allow it to dry from twelve to twenty-four hours and it is then ready for the finish.

For that beautiful, artistic, flat effect without the expense of rubbing apply a coat of Johnson's Flat Wood Finish over the Filler. This will dry hard in three or four hours, giving a durable finish which can be washed with water. For a waxed finish apply two coats of Johnson's Prepared Wax over the Filler; this should be applied with a cloth, each coat being well polished with a dry cloth or a flat stiff bristle brush similar to the brushes used for polishing shoes. Where a higher gloss is desired than the Wax gives we recommend the use of one coat of Johnson's Under-Lac over the Filler and then one coat of Wax.

FOR GOLDEN OAK, DARK OAK OR ANTWERP OAK EFFECTS. Apply a coat of one of our colored shades of Filler (see pages 19 and 20). Allow the Filler to dry from twelve to twenty-four hours and then apply the finish.

For that beautiful, artistic, flat effect without the expense of rubbing apply a coat of Johnson's Flat Wood Finish over the Filler. This will dry hard in three or four hours, giving a durable finish which can be washed with water. For a waxed finish apply two coats of Johnson's Prepared Wax over the Filler; this should be applied with a cloth, each coat being well polished with a dry cloth or a flat stiff bristle brush similar to the brushes used for polishing shoes. Where a higher gloss is desired than the Wax gives we recommend the use of one coat of Johnson's Under-Lac over the Filler and then one coat of Wax.

FOR OTHER SHADES. For all other shades such as *Mission*, *Mahogany*, *Fumed*, *Weathered*, *Flemish*, *Early English*, *etc.*, apply a coat of Johnson's Wood Dye directly upon the wood. This will dry in fifteen or twenty minutes and the work is then ready to be finished.

We recommend the use of a coat of Johnson's Flat Wood Finish over the Dye. This should be applied with a two-inch fitch brush. It dries in three or four hours, imparting that beautiful, artistic, flat effect without the expense of rubbing. For a two-coat finish apply a coat of Johnson's Under-Lac over the Dye and then one coat of Flat Wood Finish. For a waxed finish we recommend the use of two coats of Johnson's Prepared Wax over the Dye. Apply each coat with a cloth and polish it well with a dry cloth or a flat stiff bristle brush similar to the brushes used for polishing shoes.

Where a filled grain effect is desired with shades of Johnson's Wood Dye apply a coat of our Dark Paste Wood Filler No. 30 over the Dye. The Filler will dry in from twelve to twenty-four hours and the work should then be finished with Johnson's Flat Wood Finish, Under-Lac or Prepared Wax.

For open grained woods such as oak, chestnut, etc., a filler is very desirable. One coat of Dye, Filler and Flat Wood Finish gives a beautiful, artistic, economical finish which will stand water.

Finishing New Woodwork

Softwood

FOR AN INEXPENSIVE NATURAL FINISH on softwood apply a coat of Johnson's Under-Lac directly upon the wood. This will dry in a couple of hours, giving the best one-coat finish possible. If a little more body is desired apply a coat of Flat Wood Finish or varnish over the Under-Lac—Flat Wood Finish for a dull effect and varnish for a high gloss.

FOR THE BEST NATURAL FINISH THAT CAN BE OBTAINED apply a coat of Johnson's Natural Paste Wood Filler No. 10 upon the bare wood. This will dry in from twelve to twenty-four hours and the work should then be finished with Under-Lac or Flat Wood Finish, whichever is preferred.

FOR COLORED EFFECTS such as *Mission*, *Mahogany*, *Weathered*, *Flemish*, *Fumed*, *Early English*, etc., apply a coat of Johnson's Wood Dye, the desired shade, directly upon the wood with a 1½ inch or 2 inch camels-hair brush. This will dry in fifteen or twenty minutes and the work is then ready for the finish.

The finish over the Dye is largely a matter of taste. We usually recommend the use of a coat of Johnson's Flat Wood Finish. This will dry hard in three or four hours, giving that beautiful, artistic, hand-rubbed effect at one-third the cost of a rubbed varnish job. The Flat Wood Finish not only gives a beautiful but a durable finish which will stand water. For a waxed finish over the Dye apply two coats of Johnson's Prepared Wax with a cloth, bringing each coat to a polish with a dry cloth or a flat stiff bristle brush similar to the brushes used for polishing shoes. For a higher gloss than the Wax gives apply a coat of Johnson's Under-Lac over the Dye and then one coat of Wax.

If parties building new homes will drop us a line advising us what woods they are using and in which shades they are interested we shall be glad to send them panels of those woods finished in many beautiful effects. These will be of great assistance in deciding definitely upon the finish for their various rooms.

Progressive painters all over the country are familiar with Johnson's Artistic Wood Finishes and the beautiful and successful finish which can be accomplished with them. Ask your painter to show you our portfolio of wood panels in which all of our products are shown on the actual woods. If he hasn't one of these portfolios tell him to write us for one. We furnish them free and postpaid to painters, contractors and architects.

Insist upon your local dealer supplying you with Johnson's Artistic Wood Finishes. If he hasn't them in stock he can easily procure them for you through his jobber or direct from Racine.

Refinishing Old Woodwork

IF IN GOOD CONDITION. Where you do not care to change the color or g finish, give the woodwork a coat of Johnson's Prepared Wax, applying it with a cloth oval brush and bringing to a polish in ten or fifteen minutes with a dry cloth or a flat stiff brush, similar to the brushes used for polishing shoes. Woodwork can easily be kept in condition by polishing it occasionally with Johnson's Prepared Wax. Highly polished work can be easily given that beautiful, artistic, hand-rubbed effect by simply appl coat of Johnson's Flat Wood Finish right over the varnish; it will dry absolutely flat in or four hours.

IF IN FAIR CONDITION. Where woodwork is in fair condition except tha badly soiled, clean it thoroughly with Johnson's Kleen Floor and then apply a coat of Joh Prepared Wax, or Johnson's Flat Wood Finish. Flat Wood Finish gives an inexpensiv serviceable finish, as it can be washed with water.

IF IN POOR CONDITION. Where the present finish is very much scratched an it should be entirely removed—this can be easily accomplished with Johnson's Electric Be sure to entirely remove the old finish—in this lies the secret of successful refin Then allow the wood plenty of time to dry out and fill any cracks there may b Johnson's Crack Filler or putty and the work is then ready to be refinished. Proceed as f For a natural finish apply a coat of Johnson's Under-Lac and a coat of Johnson's Flat Finish. If the work is to be finished in color we recommend the use of Johnson's Woo which is made in sixteen standard shades. Apply the Dye with a 1½ inch or 2 inch c hair brush—it will penetrate deeply bringing out the beauty of the grain without rais Over the Dye apply a coat of Johnson's Flat Wood Finish with a 2 inch fitch brush—th dry absolutely flat in three or four hours. For two-coat work apply Johnson's Und over the Dye and then a coat of Flat Wood Finish.

Where parties do not care to go to the trouble or expense of removing the old var very satisfactory job can be obtained by applying a coat of Johnson's Wood Dye, the shade, right over the present finish. This will dry in a couple of hours and a coat of son's Flat Wood Finish should then be applied. Before applying Dye over the old v try it upon an inconspicuous part of the work to see how it acts. It will work beautif nine cases out of ten, but occasionally we run across a grade of varnish over which th cannot be applied.

We recommend Johnson's Flat Wood Finish very strongly for refinishing old and fir new woodwork. It not only gives a beautiful, artistic finish but at the same time an ec ical and durable finish which will stand the use of water. Ordinarily one coat of Joh Flat Wood Finish is sufficient, but occasionally on very porous woods two coats may quired.

Leading dealers everywhere handle our line. If your dealer hasn't the goods in sto can easily procure them for you through his jobber. If he is unwilling to do this wr and we will see that you are promptly supplied. We prepay freight charges (not expre orders amounting to $3.00 or more to all points in the United States east of the Mississippi

Furniture

Finishing New Furniture

The method of finishing new furniture is practically the same as finishing new woodwork. You will find instructions for this given on pages twenty-five and twenty-six. Any special instructions that are required we shall be glad to furnish promptly.

Where furniture is to be finished natural, we recommend the use of our Natural Paste Wood Filler No. 10 and then two coats of Johnson's Prepared Wax. For Golden Oak, Dark Oak or Antwerp Oak effects, apply one of the colored shades of Paste Wood Filler and then two coats of Johnson's Prepared Wax. For all other shades such as Mission, Weathered, Fumed, Flemish, Mahogany, etc., apply a coat of Johnson's Wood Dye, the desired shade, directly upon the wood and over this two coats of Johnson's Prepared Wax. Over the very dark shades of Dye we recommend the use of the Black Wax as the regular Wax might possibly show light in the grain of the wood or in the corners unless care is taken.

Where shades of Dye are used and a filled grain effect is desired, apply a coat of Dark Filler No. 30 over the Dye and then the Wax. For a high gloss apply a coat of Johnson's Under-Lac over the Dye or Filler and then the Wax.

When purchasing new furniture insist upon its being finished with Johnson's Artistic Wood Finishes. Furniture finished in this manner can easily be kept in perfect condition.

Furniture can be purchased from dealers in the white at a slight reduction in cost. You can then finish it yourself with Johnson's Artistic Wood Finishes to match your woodwork and other furniture.

Refinishing Old Furniture

The method of refinishing old furniture is identical with that of refinishing old woodwork which you will find described on page twenty-seven. For refinishing old furniture follow the instructions given for refinishing woodwork and we are sure you will be delighted with the results. Be very careful to entirely remove the old finish before the refinishing process is started. When the old finish has been thoroughly removed apply a coat of Johnson's Wood Dye, the desired shade, and then two coats of Johnson's Prepared Wax. If a higher gloss is desired than a waxed finish, apply a coat of Johnson's Under-Lac over the Dye and then one coat of Wax. For a flat effect apply a coat of Johnson's Flat Wood Finish over the Dye, or over the Under-Lac if a heavier body is desired. Where a filled grain effect is desired apply a coat of Johnson's Dark Paste Wood Filler over the Dye and then the finish.

Manual Training

Johnson's Artistic Wood Finishes are particularly adapted for Manual Training work, as they may be applied by pupils in as low as the fifth and sixth grades with entire satisfaction. They are being used and recommended for this purpose by some of the most prominent manual training instructors in the country.

Johnson's Wood Dye, Prepared Wax, Under-Lac, Paste Wood Filler and Flat Wood Finish are the preparations most largely used by manual training schools for finishing their models. We have a very attractive folder giving full instructions for the use of our finishes for this purpose and are always glad to mail a copy to interested parties.

Johnson's Wood Dye should be used for staining the models—it can be applied by the youngest pupils without any danger of laps or streaks. The dye is put up in wide mouth jars which permit of the brush being dipped into the bottle; this makes it admirable for Manual Training purposes, as it saves the loss occasioned by pouring into another receptacle.

The Dye should always be applied with a soft brush—it penetrates deeply, bringing out the beauty of the grain without raising it. The Dye comes in sixteen standard shades. All of them may be lightened by adding alcohol, darkened by adding No. 172 Flemish Oak, and two or three shades may be mixed together so that the ideas of all the pupils can be easily met.

The Dye dries in a few minutes and the wax should then be applied with a cloth and brought to a polish with a dry cloth. This finish can be accomplished in a half hour (except on large models), which makes it particularly desirable for Manual Training work as the pupils can finish their models complete in one period.

Where a higher gloss than a waxed finish is desired we recommend the use of a coat of Johnson's Under-Lac over the dye. Under-Lac will dry in an hour and the wax may then be applied. Johnson's Under-Lac is very much easier to use than shellac or varnish. It does not dry as quickly as shellac so that it can be applied by inexperienced boys; neither is it thick, sticky and slow drying like varnish, gathering dirt in the process.

For a flat effect apply Johnson's Flat Wood Finish over the Dye; this dries absolutely flat in three or four hours, giving a beautiful, artistic, hand rubbed effect without the labor of rubbing.

Where models are to be finished Natural or in shades of Golden Oak, Dark Oak, or Antwerp Oak, apply a coat of Johnson's Paste Wood Filler, the desired shade, and then the finish, either Wax, Under-Lac or Flat Wood Finish. We also recommend the use of Paste Wood Filler over the Dye where a filled-grain effect is wanted or where a particularly fine and durable finish is desired. Over the brown, mahogany and green shades of Dye use the Dark Filler No. 30.

We will gladly supply manual training instructors with generous free samples of our products, also panels of wood finished with them.

Wall Coverings

LIN-O-WALL, LINCRUSTA-WALTON and wall coverings of this sort can be very satisfactorily finished with a coat of Johnson's Wood Dye—apply it with any soft brush. These wall coverings are a trifle greasy, so it takes the Dye a little longer to dry upon them than it does upon wood. Be sure to let the Dye dry thoroughly—this will require an hour or two—then apply the finish, either Johnson's Prepared Wax, Under-Lac or Flat Wood Finish, whichever is preferred. On the whole we think that the Flat Wood Finish is most satisfactory over the Dye on these wall coverings—it dries absolutely flat in five or six hours. If a gloss finish is desired apply Johnson's Under-Lac over the Dye and then a coat of Johnson's Prepared Wax.

Where it is desirable to change the color scheme of rooms finished with Lin-O-Wall or Lincrusta-Walton it is not necessary to remove the present wall covering—simply apply a coat of Johnson's Wood Dye, the desired shade, right over the present shade. Of course, a light shade cannot be applied directly over a dark.

BURLAP. This material can be finished very satisfactorily by first applying a coat of Johnson's Under-Lac and then giving the work a coat of Johnson's Wood Dye, the desired shade. The Under-Lac acts as a size and prevents the burlap from absorbing large quantities of Dye. Both the Dye and Under-Lac should be applied with an ordinary varnish brush.

BEAVER BOARD, UTILITY BOARD, etc., can be very satisfactorily finished with Johnson's Wood Dye. It can be applied with a brush but very much better results are secured when the Dye is applied to partition boards of this kind with an air brush.

Johnson's Wood Dye for Air Brush Use

Johnson's Wood Dye is being used very satisfactorily all over the country by users of air brushes. We recently sent samples of our product to one of the largest air brush manufacturers in the country in order to get their opinion and their report came back that the Dyes worked "most perfectly" in this manner.

There are many advantages in Johnson's Wood Dye for air brush use. It dries instantly—all of the colors blend perfectly—will not rub off or fade and one color can be worked over the other without lifting the under color. Another advantage is the fact that lettering can be done over any of our shades within five or ten minutes and the Dye will not show through even when the lettering is done with white.

Johnson's Artistic Wood Finishes are for sale by all leading paint, hardware and drug dealers. Do not accept a substitute. If your dealer hasn't our goods in stock he can easily procure them for you within a few hours by ordering through his jobber.

Wood Finishing Points to Remember

That Johnson's Prepared Wax should be used upon all furniture, including pianos, well as upon woodwork and floors.

That Johnson's Prepared Wax is the only preparation that can be successfully used upc Mission furniture and woodwork.

That Johnson's Prepared Wax will not show scratches and heel prints, and that it nev becomes sticky or tacky.

That floors, woodwork and furniture finished with Johnson's Prepared Wax can be easi and inexpensively kept in perfect condition.

That Johnson's Wood Dye should always be applied with a soft brush.

That with Johnson's Wood Dye all hard and soft wood may be given any desired colo

That all shades of Johnson's Wood Dye may be lightened by adding alcohol and darkene by adding Flemish Oak Dye No. 172.

That all shades of Wood Dye will show darker on soft woods than upon hardwood becaus the soft wood absorbs more of the dye than the hardwood.

That Johnson's Wood Dye should always be tried first upon a small piece of the sam kind of wood upon which it is to be used, to see if it is just the shade desired.

That Johnson's Under-Lac should be used for a higher gloss than a waxed finish.

That Johnson's Under-Lac should be used where you have heretofore used shellac c varnish.

That Johnson's Under-Lac is especially adapted for use on linoleums, oilcloth, etc.

That with Johnson's Flat Wood Finish an artistic, hand-rubbed effect may be obtaine at one-third the cost of the labor on a rubbed-varnish job.

That Johnson's Flat Wood Finish may be rubbed if desired to a semi-gloss or egg-she finish.

That Johnson's Artistic Wood Finishes always give satisfaction.

That Johnson's Artistic Wood Finishes are being specified by some of the most promine architects.

That they are being used by many of the finest painters and wood finishers in the countr

That your dealer can easily procure our goods for you direct from Racine or throug his jobber.

That we will see that you are supplied if your dealer is unwilling to order for you.

Quantities

Johnson's Prepared Wax	1 pound covers 250 sq. ft. one coat.
Johnson's Powdered Wax	Large size can is sufficient for 10,000 sq. ft.
Johnson's Wood Dye	1 gallon covers 700 sq. ft. on hardwood and 400 on softwoo
Johnson's Under-Lac	1 gallon covers 500 sq. ft.
Johnson's Flat Wood Finish	1 gallon covers 500 sq. ft.
Johnson's Kleen Floor	Half-gallon cleans 350 sq. ft.
Johnson's Electric Solvo	1 gallon ordinarily softens 300 sq. ft. of old finish.
Johnson's Crack Filler	1 pound ordinarily covers 30 sq. ft.
Johnson's Paste Wood Filler	1 pound fills 40 sq. ft.
Johnson's Plasto-Filler	1 pound covers 60 sq. ft.
Johnson's Floor Finish No. 1	1 gallon covers 600 sq. ft.

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13-2427

Architectural Specifications

For the painting, enameling, staining and finishing of woods generally in a medium and first class manner, also for the painting of brick, plaster, cement, concrete, iron, etc. Special attention is called to the notes attached for an explanation of the reason why, etc.

These specifications were received and indorsed after full deliberation by the Pennsylvania State Association of Master House Painters and Decorators in Congress assembled at Philadelphia, January 15th, 1913.

It was also agreed to that where proprietary materials are mentioned, that the words "or its equal" be inserted after mames of said materials.

JOHN DEWAR.

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PREFACE.

Mr. President and Members of the Master House Painters and Decorators Association of Pennsylvania in convention assembled.

Gentlemen. In compliance with your request and the solicitations of a number of Pennsylvania Architects, I have endeavored to compile a general working specification covering the painting and finishing of wood, brick, plaster, cement, iron and steel. After getting a proper start the work became very fascinating, but as to its ease, try it.

I do not entertain the thought for a moment that all practical house painters will quite agree with me in all my assertions and conclusions. I have not stated them as a theorist, but have drawn from my personal experience of years as man and master in the arts of house painting and finishing. I freely allow to others what I claim for myself. Where a difference of opinion would appear to exist, I am quite sure a satisfactory and practical adjustment could be arrived at without much controversy, or change in these specification, provided it be not a case of "When Greek meets Greek."

I am quite well aware of many "short cuts" being traversed to produce results cheap and quick, or near right for the present. I have endeavored to make these specifications a standard, for there is no "Royal Road" to a substantially painted and finished structure.

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It is not my purpose to exploit any particular materials, but some things not generally known, but of special virtue I have mentioned firmly believing it to be to your advantage to give them a fair trial. At any time I shall be pleased to attempt to answer any reasonable question regarding these specifications, or materials.

It is practically impossible to provide in these or any stereotyped specifications for all contingencies that arise from time to time. I have endeavored to protect the Architect while being fair to the Painter. I would recommend to the Architect that he select one or more Master Painters in his vicinity having a good reputation and practical knowledge of the business, and that he make in a measure a confidant of such when seeking information regarding materials and the best means to employ or specify for the securing of certain results. No Architect should feel himself as being under any special obligation to such painter or painters, nor would any fair man want him to be.

Hoping this report will in a measure fill the requirements, or at least be the forerunner of some future one more perfect in details,

Very sincerely,

John Dewar,

January, 1913. Pittsburgh, Pa.

NOTE.---Any person or persons desiring to publish this specification and notes, or any portion of either must receive the consent of the author in writing to do so. A copy will be sent any one interested, on application.

ARCHITECTURAL SPECIFICATIONS.

For the painting, enameling, staining and finishing of woods generally in a medium and first class manner, also for the painting of brick, plaster, cement, concrete, iron, etc. Special attention is called to the notes attached for an explanation of the reason why, etc.

Painting New Exterior Woodwork.

Medium—All knots, rosin and sap portions shall be properly shellaced. Paint one coat white priming brushed well into the wood, after which all nail holes, open joints and other imperfections shall be closed solid with putty containing 20 per cent white lead, then apply two coats of paint, colors to be selected. Each coat must be thoroughly dry before the application of another. Paint the back of all window and door frames one coat before setting, sash runners of window frames to receive two coats of oil, stained if required, the last coat to be applied at completion. No paint to be applied during wet or foggy weather. (See Note 1).

First Class—Wood work should be painted as above specified using one additional coat. (See Note 1).

Repainting of Exterior Wood Work.

Remove such old paint as may be necessary from exterior wood work by scraping, burning

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or with paint remover as conditions may require. Sandpaper and touch up with paint one or two coats as found necessary all that portion from which the old paint has been removed. Paint all wood work two coats, colors to be selected. Do all necessary sandpapering and puttying. (See Note 2).

Staining of Exterior Wood Work.

Medium—All exterior wood work (or a portion as the case may be) to receive one coat of linseed oil stain, brushed well and uniformly into the wood. Color to be as required. Pigments to be selected for their permanency of color. Vehicle to consist of 40 per cent of 160 degree benzole and 60 per cent raw linseed oil, all nail holes and other imperfections to be closed with lead putty colored to match stain, then apply one good coat of raw linseed oil containing 10 per cent turpentine. (See Note 3).

First Class—Specify one additional coat of oil containing 10 per cent turpentine. (See Note 3).

Staining Shingles. Dip shingles two thirds their length in stain specified as above, color to be determined. After shingles are in position touch up and apply one coat of linseed oil containing 10 per cent turpentine. (See Note 3).

Restaining of Exterior Wood Work.

Prepare and restain all or such portion of exterior wood work as may be found necessary, color conforming closely to original stain. Coat all stained wood work with two coats of linseed oil containing 10 per cent turpentine. Between first and second coats close up all imperfections with putty colored to match stain. (See Note 4).

Painting New Exterior Brick Work.

Paint all new exterior brick work two good coats of Venetian Red containing about 20 per cent white lead, the vehicle to consist of 80 per cent linseed oil and 20 per cent turpentine, after which apply one coat of Flat Brick Color, shade to be selected. Care must be exercised to cover thoroughly and cut in neatly each stretch so as to produce a uniform flat surface. This color must not be worked too thin. (See Note 5).

Repainting Old Exterior Brick Work.

Close up all open joints and other imperfections. Touch up with paint all such places including any portion from which the paint has been badly worn. Paint all exterior brick work one coat of Venetian Red containing about 20 per cent white lead, the vehicle to consist of 80 per cent linseed oil and 20 per cent pure turpentine, after which apply one coat of Flat Brick Color, shade to be selected. Care must be exercised to cover thoroughly and cut in neatly

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each stretch so as to produce a uniform flat surface. This color must not be worked too thin. (See Notes 5 and 6).

Painting New Exterior Plaster, Cement and Concrete.

Prepare and close up all cracks and other surface imperfections with plaster or cement. To all surfaces apply a **thorough** coat of "Macnichol's Basic Coater," giving twenty-four hours to dry, after which apply three coats of paint, color to be selected, each coat to be thoroughly dry before the application of another. The plaster or cement must be thoroughly dry before painting. (See Note 7).

Repainting Old Exterior Plaster Cement and Concrete.

Scrape off old paint where necessary, close up all cracks and other surface imperfections with plaster or cement. Apply a good coat of "Macnichol's Basic Coater" over all new cement or plaster, giving twenty-four hours to dry, after which apply two coats of paint, color to be selected, each coat to be thoroughly dry before the application of another. The plaster or cement must be thoroughly dry before painting. (See Note 7).

Painting Exterior New Iron and Steel.

First Class—All iron or steel work shall be gone over carefully before painting and any dirt or corrosion shall be removed by the aid of steel brushes. Paint all iron work with one coat of "Kardite" chromatized red lead mixed on the job in the proportion of 25 lbs. to one gallon of pure linseed oil, or with "Kardite Red Rust Inhibitive Paint," after which apply two coats of pure lamp black mixed with "Flexible Compound," or pure linseed oil, or any other pigment necessary to produce the desired color. In using "Flexible Compound" as a vehicle no **turpentine nor dryer** should be used, each coat must be thoroughly dry before applying another. (See Note 8).

Medium—All iron work shall be gone over carefully before painting and any dirt or corrosion shall be removed by the aid of steel brushes. Paint all iron work with one coat of Pure Red Lead, the vehicle being 80 per cent raw linseed oil and 20 per cent turpentine, after which apply two coats of pure lamp black with the addition of a small quantity of Prussian Blue, mixed with about 90 per cent linseed oil and 10 per cent turpentine. Each coat must be thoroughly dry before applying another. (See Note 9).

Repainting of Exterior Iron Fences, etc.

Remove all loose paint and corrosion by scraping and a steel brush. Touch up with Pure Red Lead all that portion from which the paint is removed. Paint all surfaces two coats pure lamp black, adding a small quantity of Prussian Blue,

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with "Flexible Compound." Each coat must be thoroughly dry before applying another. Use no turpentine or dryer in this Compound. (See Notes 9 and 8).

Painting Exterior Galvanized Iron.

All galvanized iron work shall receive one thorough coat of a solution made by dissolving 8 ounces of Copper Acetate in one gallon of warm water. This preparation must be thoroughly brushed on, when dry apply one coat of Pure Red Lead mixed with 50 per cent linseed oil and 50 per cent turpentine, followed by two coats of paint, color to be selected. (See Note 10).

Painting Copper Work.

All copper surfaces to be thoroughly sponged off with 160 degree benzole, after which apply one coat of Pure Red Lead mixed with 50 per cent linseed oil and 50 per cent turpentine, well rubbed out. Then apply two coats of paint, color to be selected. (See Note 11).

Painting Tin Work.

Remove all rosin and other imperfections. Paint as soon as practicable all tin work one coat of Pure Red Lead mixed with 60 per cent raw linseed oil and 40 per cent turpentine, after which apply one coat of Venetian Red or Princes Metalic Brown, mixed in pure boiled oil. (See Note 12).

Plain Painting for Interior New Wood Work.

Shellac all knots and sap-wood, paint wood work (locating same) three good coats, color to be selected. After the first or priming coat close up with lead putty all nail holes and other imperfections. Do all necessary sandpapering between coats. (See Note 13).

Painting and Graining Interior New Wood Work.

Shellac all knots and sapwood, paint all wood work (locating same) two coats, no oil to be used in this paint other than that in which the lead is ground. In mixing use a small quantity of a good mixing varnish, thinning with turpentine so that the paint will dry with a flat egg shell gloss, sandpapering each coat perfectly smooth.

Grain in best manner in imitation of Hardwood to be selected, the graining color to be used as flat as possible, consistent with working out. Varnish all grained work one coat of a good bodied varnish. (See Note 14).

Natural Finish for New Interior Soft Woods.

All wood work shall be thoroughly gone over, cleaned up and sandpapered where necessary, after which apply one coat of white shellac and two coats of a good bodied varnish, the last coat to be evenly flowed on. After shellacing close up all nail holes and other imperfections with putty colored to match wood, being

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careful to rub off any surplus putty. Sandpaper thoroughly between coats. (See Note 15).

Staining and Varnishing New Interior Soft Woods

All wood work shall receive one light coat of 25 per cent linseed oil and 75 per cent turpentine, sandpaper and stain in best manner with an oil stain containing about 50 per cent turpentine, color to be selected. Close up all nail holes and other imperfections with lead putty colored to match stain, being careful to wipe off any surplus putty marks. Varnish all stained work two good coats of a strong bodied varnish, the last coat to be evenly flowed on. Sandpaper between coats, each coat to be thoroughly dry before another is applied. (See Note 16).

Painting and Enameling Interior New Wood Work

Medium—All wood work (specify location) shall be gone over carefully. Shellac all knots and sap portions. Prime with one thin coat of white paint, well brushed into the wood, after which sandpaper thoroughly, closing up all nail holes and other imperfections with lead putty. Apply one medium coat of pure grain alcohol white shellac. Sandpaper lightly. Apply three coats of white paint consisting of about 60 per cent white lead and 40 per cent zinc oxide and one coat of straight pure zinc oxide, followed by one coat of best enamel, freely and evenly applied, all coats to be tinted as required. Each coat must be thoroughly dry and well sandpapered before the application of another. (See Note 17).

First Class—Apply one additional coat to the above specification (four coats) after the shellac, followed by the straight zinc and two coats of best enamel, the last coat of enamel to be evenly rubbed with water and powdered pumice stone to a satin or china gloss finish. (See Notes 17 and 18).

Painting New Plaster or Cement With Distemper Colors or Calcimine.

Close up all cracks and other imperfections with plaster or cement. After which apply one full coat of "Macnichol's Basic Coater," well brushed in, allowing twenty-four hours to dry. Then apply one medium or light coat of paint as a size, to consist of at least 50 per cent linseed oil, to be followed when dry with one full, free and even coat of calcimine or prepared distemper paint. If one coat of distemper paint does not produce a solid surface, one additional coat must be given. Thoroughly protect all surroundings. (See Note 19).

Painting and Varnishing New Interior Plaster and Cement Surfaces.

Medium—Close up all cracks and other imperfections with plaster or cement. Apply one full

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coat of "Macnichol's Basic Coater" to all plaster or cement surfaces, brushed well in, giving twenty-four hours to dry, after which apply three coats of paint, color to be selected. Then apply one full coat of a good wearing varnish. Each coat to be perfectly dry before the application of another. (See Note 20).

First Class—Sandpaper all surfaces, close up with plaster or cement all cracks or other imperfections. Apply one full coat of "Macnichol's Basic Coater" well brushed in, giving twenty-four hours to dry, after which paint all surfaces four coats, color to be selected. The paint should be composed of 60 per cent white lead and 40 per cent pure zinc oxide, the first coat to contain about 50 per cent oil, 10 per cent of a good mixing varnish and 40 per cent turpentine, the three subsequent coats to contain about 30 per cent oil, 20 per cent varnish and 50 per cent turpentine, the last coat to be lightly and evenly stippled. Each coat must be thoroughly dry before the application of another. (See Notes 21 and 7).

Varnishing and Finishing of Hardwoods.

Medium—Sandpaper and remove all surfaces defects, stain if desired, fill with best paste filler, colored if necessary, thoroughly cleaning surface and mouldings. Shellac one coat and varnish two coats of a good varnish suitable for this purpose. After the shellac coat, close up all nail holes and other imperfections with lead putty, colored as required, all surplus putty to be carefully wiped off. Sandpaper between each coat. Care must be taken during varnishing to keep the premises as free from dust as possible. (See Note 22).

First Class—Sandpaper and remove all surface defects. Stain if required. Fill with best paste filler, colored if necessary. Thoroughly clean all surfaces and mouldings. Shellac one coat pure grain alcohol shellac and varnish four coats of a first class varnish designed for this class of work. Rub all varnish surfaces true and even with oil and pumice stone to a dull satin finish. Thoroughly clean all oil and pumice stone from surface. Each coat must be thoroughly dry and sandpapered before the application of another. Care must betken during varnishing to keep premises as free from dust as possible. (See Note 23).

Staining and Waxing of Hardwoods.

Medium—Stain all work with an approved stain, color to be selected. Do necessary sandpapering, after which apply one coat of paste filler, colored to conform with stain. Thoroughly clean all surfaces and apply one medium coat of shellac. Sandpaper lightly and apply one good coat of an approved finishing wax, permitting

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it to stand until semi-hard, then to be thoroughly rubbed and polished to a hard surface. (See Note 24).

First Class—Coat all surfaces (specify location) with one medium coat of clean water (this for oak only). When thoroughly dry, sandpaper to a perfectly smooth finish, after which stain uniformly and in best manner with an approved water stain, color to be selected. Sandpaper lightly and fill with paste filler, colored to conform with stain. Apply one coat of pure grain alcohol shellac, sandpaper lightly, after which apply two coats of an approved finishing wax, giving three days between coats. Permit each coat to become semi-hard, then to be thoroughly rubbed and polished to a hard surface. (See Note 25).

Finishing Pine Floors.

Thoroughly cleanse and remove all surface imperfections, shellac one coat and varnish two coats of a good varnish designed for this purpose, each coat must be thoroughly dry before the application of another. All necessary care must be taken to protect this work from damage. (See Note 26).

Varnish Finish for Hardwood Floors.

Thoroughly cleanse and remove all surface imperfections. Fill all wood work with a good paste filler, cleaning thoroughly from surface.

Stain if required. Shellac one coat and varnish two coats of best varnish designed for floor use. Each coat must be thoroughly dry before the application of another. Care must be taken to protect floors from damage. (See Note 27).

Wax Finishing of Hardwood Floors.

Thoroughly cleanse and remove all surface imperfections, fill all wood surface with one coat of best paste filler, thoroughly cleansing same when semi-dry, from surface. Stain if required. Apply one thin even coat of pure grain alcohol shellac. Sandpaper lightly without showing laps, after which apply two coats of best "Prepared Floor Wax," giving two or three days between coats. Each coat must be thoroughly rubbed to a hard dry surface. Care must be taken to protect floors from damage. (See Note 28).

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NOTES

Note 1. — All authorities agree that pure raw linseed oil and pure spirits of turpentine are the best vehicles for exterior paints. The vehicle of first or priming coat on new wood, also second coat, should consist of 80 per cent pure raw linseed oil and 20 per cent pure spirits of turpentine, the final coat 90 per cent pure raw linseed oil and 10 per cent pure spirits of turpentine, all to contain necessary driers. When four coats are used the first, second and third coats should be composed of 80 per cent oil and 20 per cent turpentine, the fourth coat 90 per cent oil and 10 per cent turpentine.

There exists some diversity of opinion as to the best paint pigment or pigments in combination. How necessary it should be that the construction of a paint film be as near perfect as possible. The necessity of this should be apparent to us all, especially when we are confronted with the fact that "the average paint coating is only three one-thousandths of an inch thick, and yet this thin coating is required to withstand expansion and contraction of the underlying surface, abrasion or wear from storms of dust and sand, or rain, sleet, hail, and absorbing, drawing and expanding influences of the summer's sun and contraction from the cold of winter. It must have both hardness, to withstand to a reasonable extent this surface wear, and yet enough elasticity to meet internal strain and to conform to changes in the underlying surface, and it must penetrate and cling to the surface upon which it is applied. It must also retard and prevent from access to the underlying surface both the moisture and atmospheric gases which cause decay," and, if possessing the virtues of a good paint, it must in the course of time, when repainting becomes necessary, present a suitable foundation for the new paint coatings.

It is generally accepted that a white or tinted base paint containing about 75 per cent white lead and 25 per cent zinc oxide is of a high standard. When used near or at the sea shore, also in the southern states it can be improved by a change to the following: 60 per cent white lead and 40 per cent zinc oxide. The purpose in combining these two best paint pigments are, that the one makes strong the weak points of the other, giving us an ideal paint coating. The zinc makes the film stronger and harder, also practically non-absorbent by reason of those qualities and with its fineness of texture, fills up the voids caused by the coarser pigment. After a most thorough and practical personal investigation as to results I recommend the above combinations, having used them in my practice for years. I have the manufacturer combine and

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grind the two pigments together, thereby getting a thorough amalgamation.

When the result required is a white or color tinted paint, it is advisable to use the same percentage of different basic pigments and coloring matter in all of the coats, on account of obtaining a uniform expansion and contraction, solidity of color, etc.

When **"Prepared Mixed Paints"** in paste form are used, the **limit** of inert pigments should be 15 per cent. This percentage may be composed of barytes, silica or asbestine, or a mixture of such pigments. To this amount there should be no objection as up to that extent these inerts have their values as part of a good paint film, but vehicle proportions as set forth should be followed.

The use of asbestine is principally to hold up in suspension the heavier pigments in the paint, its fluffy and rod-like form being valuable for this purpose. It is also said to act as a reinforcing pigment in the same way that iron bars act in reinforcing cement or concrete structures.

Straight white lead makes a splendid primer. Ochre should never be used, nor boiled linseed oil for under coatings. When the color of the finishing coat is required to be a strong solid color such as green, red, etc., by using these strong colored paints from the foundation up you will not get a solidity of body, therefore I would suggest the use of a strong tinted white base for under coatings.

In the painting of cypress and southern yellow pine the vehicle in the priming coat and **priming coat only** should be 40 per cent of 160 degree benzole, 10 per cent pure spirits of turpentine and 50 per cent pure raw linseed oil, proceeding with the subsequent coats as specified above. The character of these woods is such as will not permit of the penetration of paint made by the usual vehicle practice. With the turpentine and the addition of benzole which is one of the greatest penetrating solvents of rosin, gums and grease known, they carry the oil and pigment when well brushed out, into the wood and it there finds a lodgment forming a substantial and permanent foundation for the subsequent coatings. The benzole like turpentine after performing its mission evaporates entirely leaving no residue. (See Dewar's article on "Modern Lumber as a Problem for the Painter.")

From the beginning to the finish of a first class residence or other important operation considerable time may elapse, not infrequently a year or more, therefore a necessity for the additional or fourth coat of paint. I would recommend for their distribution, after the priming or first coat and the necessary puttying up, that the second coat be applied, the third and fourth coats about the time of completion of building.

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Another substantial reason for the fourth coat is that the householder realizing that he has a new residence is usually less watchful as to any necessity for repainting for a term of years.

With the application of the priming coat when the work is first put in place, followed by the two coats probably six months or a year after, such a condition will of necessity require repainting in probably less than four year. This proves the economy of the fourth coat which under average conditions lasts as a protective agency for probably six or seven years before the necessity for repainting arises.

Note 2. — In the work of repainting it is practically impossible to intelligently specify without being familiar with conditions, as so much depends upon them.

The basic paint pigments should be as specified in "Note 1." The proportions of vehicles for first coat must be determined by conditions. For instance if the vehicle of the old paint coatings are dried out, leaving an absorbing surface, hungry as it were, the vehicle for first coat should consist of about 75 per cent raw linseed oil and 25 per cent turpentine, second or final coat 90 per cent raw linseed oil and 10 per cent turpentine, or if the surface be hard and non-absorbing the proper proportions of vehicle for first coat should be about 50 per cent oil and 50 per cent turpentine, the final coat 90 per cent oil and

10 per cent turpentine. Not infrequently I have found it necessary in repainting from a number of causes to give all of the wood work three coats.

The overcoming of these imperfect conditions and producing the best results possible is largely a work of diagnosis consisting of about 75 per cent man and 25 per cent material. The remedy for the different ailments consists in the different proportions of the vehicle to meet the diversified conditions, and not with the pigments.

The paint burner ever being a menace, I would discourage its use where possible. In every instance I would have the owner of the building give his consent to its use, also that he notify his insurance company and get a permit from it consenting to its use.

Note 3. — This stain is suitable for all kinds of wood used for exterior finish. It must be remembered that a stain implies a transparent coloring and not a paint coating which is opaque. If it is desired to stain oak or cypress to a dark green or a dark brown color usually used on the timbering and finish of houses designed after the old English period, two coats of stain should be specified to get the necessary depth of color. To attempt this with one coat would result practically in a paint coating, with the covering or hiding the figure of the wood. If it is desired

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to stain oak silver grey or other light colors but one coat is necessary. Shingles owing to depth of color required, frequently require a second coat of stain after they are set in place. The use of benzole in the stain as I have stated becomes the active penetrating factor, carrying the coloring matter and oil into the woods, it has about the same evaporating consistency as turpentine.

There being a substantial difference between a paint coating and a stain, therefore the stain specified can be used when necessary for both coats.

Where a perfectly flat surface is desired the second coat of oil may be an objection, but for durability I would recommend it, also for the reason that the oil gloss shorlty flattens down.

There are a number of very good shingle stains on the market.

Note 4. — Restaining is also a work of diagnosis as to whether the entire work should be gone over with a light coat of stain or a portion, where the former is badly used up, and whether it should have one or two coats of oil. In this case an examination will quickly speak for itself. A coat of oil over the old stain will make quite a difference in appearance of old color.

Note 5. — If penciling or striping of joints in either white, black, or other color should be required, specify same after the application of flat coat, the lines to be true to the size of brick and of uniform width.

There are a number of Paint manufacturers who make a first class prepared "Flat Brick Color," in red, buff and grey, each consisting of a number of shades, light, medium and dark, or they will furnish any required shade or color.

This specification applies to **flat red brick** finish. If a buff or grey, flat brick color is required, instead of Venetian Red, specify two coats of lead and oil paint, color to conform to brick selected. When a buff or grey brick color is desired it should be so stated in specifications, as a lead and zinc base paint costs considerable more than Venetian Red.

For a gloss finish in either red, buff or grey, or any other color, three full coats are required, the final coat containing about 90 per cent linseed oil and 10 per cent turpentine.

Note 6. — Do not expect the painter to be a brick mason. If any amount of repointing is necessary, make special arrangements for it.

Usually one coat of oil color is sufficient, but where it is badly worn, give two coats of an oil paint, as it is practically necessary to have a uniform gloss surface before applying the flat brick color.

For a bright gloss finish on old work in any color or shade, apply two full coats, the final

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coat containing about 90 per cent oil and 10 per cent turpentine.

Note 7. — All practical painters will agree with me that in painting over plaster and cement surfaces many serious difficulties are encountered with a probability of much future trouble, by reason of the free lime and alkali formed in the drying out of these materials, they being a part of the composition of plaster and cements. Their destructive action on colors and paint vehicles are well known. A necessary qualification of a cement paint is, that its vehicle and embellishing properties (colors) be not impaired in its contact with the cement or lime. After some years of personal investigation and experience in the use of "Macnichol's Basic Coater," it has proven itself to me to be of inestimable value in the preparation of my plaster and cement surfaces for painting, or otherwise embellishing, by neutralizing those destructive agencies, without in any manner what-so-ever impairing the strength or virtue of the cement or lime. In fact deterioration of vehicle and colors are immune from those causes, also the elimination of the usual discolorations so objectionable, when applied over "Macnichol's Basic Coater." Scientific investigation into its action and merits has shown an improvement to the cement and lime. It should be freely applied and when dry it acts in a measure as a light sizing coat over which any paint can be applied with perfect safety.

A very necessary qualification of a cement paint is also its resisting and non-absorbing ability to keep out water and dampness. One hundred per cent of the present day cement paints are designed for that purpose. Eighty per cent of them shortly break down, owing to their faulty composition, in the use of practically unknown and not thoroughly tried out vehicles, also because of the disintegrating action of the alkali in the cement and lime. With the use of "Macnichol's Basic Coater" I have no hesitancy in recommending the use of the following paint: pigments, 70 per cent white lead, 30 per cent zinc oxide; vehicle, 80 per cent raw linseed oil, 20 per cent turpentine; for the last coat, 90 per cent raw linseed oil and 10 per cent turpentine, each coat to contain one pint of a good gum mixing varnish to the gallon of paint. It must be of good body and well worked into the surface, each coat to be thoroughly dry before the application of another.

If a semi-flat surface is desired for final coat reduce quantity of oil in same. There are a number of very good paints found on the market practically designed for this class of work, but I certainly would recommend the use of "Macnichol's Basic Coater" in conjunction with them. In the use of a semi-flat coat for a finish I would positively recommend the under coating to be of a good gloss for the reason that the more flat a paint is the more its absorbing properties, do

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not overlook the fact that an outside cement paint is under consideration.

For old brick work repointed with cement or lime, before repainting, I would recommend a coat of "Macnichol's Basic Coater" as a preventative of the alkali in the pointing material from destroying the color of the paint.

No paint should be applied over dampness. It is not in accord with nature's laws that a paint film should withstand the actions emanating from a wet foundation and not disintegrate quickly. The observing painters know whereof I speak.

Note 8.— "Kardite Red Lead" and "Kardite Red Rust Inhibitive Paints" are chromatized preparations, which give excellent service upon iron and steel. The Atlantic City test fence, under the supervision of the American Society for Testing Materials, has shown that the following pigments are well suited as primers for metal: "Sublimed Blue Lead," "Red Lead," "Chromated Pigments."

Other suitable paints for this work are described in an article entitled "Primers for Metal," as read by H. A. Gardner of the Institute of Industrial Research before the Pennsylvania State Association of Master Painters, Philadelphia, Jan. 15, 1913.

"Flexible Compound" is a special prepared oil containing compounds which make it very durable and water resisting, turpentine and dryer must not be used in connection with it, raw linseed oil may be used as a reducer to the extent of

50 per cent. I have used "Flexible Compound" with splendid success, for structural iron and steel, also for iron fencing I know of no better paint.

Note 9.— "Red Lead" when found to be pure is of exceptional merit as an iron and steel paint pigment. For structure work two coats may be applied. This lead is found to be very much adulterated, especially when purchased in bulk for large operations, but it can be procured pure. A circumstance comes to mind. A very large steel construction building was under erection. The Engineer's specifications called for "all steel work to be painted two coats of 'Pure Red Lead,' one at the mill, the other when assembled." The contractor bought and paid for what he supposed to be "Pure Red Lead." It having the color of that pigment, he took it for granted that it was the true article as specified and ordered by him. The operation was finished with it, but a portion of the so-called "Pure Red Lead" was procured from the building and on analysis it was found to contain 60 per cent Red Lead and 40 per cent Calcium Carbonate (Whiting) which is proven to be **a promoter** of corrosion.

Within the last year a process in the manufacture of Red Lead has been discovered which permits the painter to procure his red lead pure and in such a manner that it does not cake or harden in the package, thus eliminating its one great weakness.

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Lamp black ground in linseed oil is also a first class pigment. For a more dense black add a small quantity of Prussian Blue. When this combination is mixed with "Flexible Compound" it produces a splendid paint for this purpose.

Note 10.—The adhesion of paint to the surface of galvanized iron has long been a problem to the painter, but it has been practically demonstrated that the preparation specified will remove the objectionable features if thoroughly applied. After this solution remains on the metal for 24 hours, it will have the effect of removing all the grease and other substances which interfere with proper painting. It will produce a blackened, coppered surface to paint upon, which will readily hold the paint. Other solutions, such as a nitric acid and muriatic acid, cause rusting of the iron surface and interfere with proper painting. The use of copper acetate, however, will not cause such conditions in any manner whatsoever. Copper acetate is simply a solution of metallic copper in strong vinegar. It can be made by the painter himself, but it is cheaper to buy it in the drug store and mix it in hot water as specified. I would strongly insist upon the first coat of paint being red lead with about 50 per cent raw linseed oil and 50 per cent turpentine. If the color desired for the finish coat be dark, one additional coat will be sufficient, but if white or a light tinted color it will require at least two coats.

Note 11.— The adhesion of paint to copper surfaces has been quite a problem, the trouble being caused by an oil or grease used to keep the surface of the copper from becoming tarnished or stained while in stock and transportation. With the removal of these by the use of benzole as a cleaner, followed by a hard drying body of red lead, this forming a firm foundation for the subsequent paint coatings permanent results are secured. The writer does not approve of the painting of copper.

Note 12.— For new tin work on roofs I would only recommend two coats of paint, and the application of one coat every two or three years, thereafter. The tin being an unabsorbing body, and with the accumulation of paints on the surface, with the expansion and contraction of the metal, checking and alligatoring would very shortly appear. Also the snow and rain lying on the surface for an indefinite time, assists in creating the necessity for a careful watch of the tin roof work.

White lead or praphite paint should not be applied directly to the new tin work, but for subsequent coatings there is no objection to them.

Note 13.— If color required be white or lightly tinted, the wood work should first receive one coat of shellac to prevent discolorations from rosin and sapwood. If varnish coat should be required

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over paint, specify all painted work to receive one coat of a good wearing light color varnish, evenly applied.

Note 14.— If a first class job is required specify one additional coat of varnish to be full and evenly applied, each coat to be thoroughly dried before the application of another. If a flat finish is required, specify the last coat of varnish to be rubbed evenly to a flat finish with crude oil and pumice stone, all oil and pumice stone to be thoroughly cleaned off at completion.

A flat finish may be secured by using what is termed a "Flat Varnish." In the use of a flat varnish two coats are required, the first being a gloss varnish. About 50 per cent of these varnishes contain a large percentage of wax, over which you cannot apply at any future time paint or varnish, as neither will adhere permanently to a wax surface. The use of some of these flat varnishes is commendable, especially in producing certain results on Natural Hardwoods.

Graining is practically becoming a lost art, owing to the general use of Hardwoods. Where the work is well done this specification should produce splendid results. Some painters may not agree with me in the number of coats and manner of mixing the ground coating; let them try it and they will find no cracking or crazing of their varnish, but of course the varnish must be good and undercoating perfectly dry.

Woods best adapted to painting and graining are birch, cherry, maple, poplar and white pine.

Note 15.—This would apply to white pine, poplar, yellow pine, cypress, etc. Some times a flat finish is required; in that case specify the rubbing with oil and pumice stone to a dull even finish. I do not recommend close rubbing on two coats of varnish as it must be kept in mind that close rubbing will practically remove one coat of varnish. I do not recommend any rubbing for servants' quarters, nor yet for the average medium job.

The natural color of these woods is sometimes an objection. In that case I add a "touch" of burnt sienna, or burnt and raw sienna, to the first coat of varnish, not sufficient to produce a stain, simply giving the wood a warm pleasing glow, removing the harshness of the natural color.

Note 16.— The purpose of applying a thin coat of oil to the wood work before staining is that certain portions of the surface may be very much softer than others, in fact it may appear in spots, all over. With the application of the oil as specified, you in a measure stop the suction of those soft places and get a practically uniform surface on which to work the stain. A thin coat of

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shellac instead of the oil might be used, but I prefer the oil as thinned with the turpentine, as I will get a more uniform absorption into the wood for the stain, the shellac in a measure stopping absorption.

For a flat surface I would specify the rubbing with oil and pumice stone to a dull finish, for close rubbing I would specify one additional coat of varnish. This specification would apply to white and yellow pine, poplar, cypress, etc.

Note 17.— With the application of a second coat of enamel this specification may be rubbed with water and powdered pumice stone to a very good finish. If a semi-gloss or flat finish is desired with but one coat of enamel, reduce the enamel by mixing into it a portion of the straight zinc coater necessary to give the condition required. To fully obtain this result requires very careful brushing, so as not to show laps, brush marks and cording, but it can be accomplished very nicely.

With the exception of the priming coat no oil should be used except such as may be found in the stiff lead and zinc, the priming coat should consist of about 40 per cent oil and 60 per cent turpentine, light of body and well brushed into the wood. I have my zinc for enameling purposes ground in Poppy oil, which greatly minimizes the chances of the work turning yellow when confined to a dark room. The use of linseed oil is a strong factor in the work turning yellow when excluded from a strong light. In the preparation of my several under paint coatings I use instead of oil as a binder, a portion of a good mixing enamel varnish, each coat must be worked flat. In using the straight zinc oxide for a final coat of paint on this class of work I find that I can get purer tints of greater variety, without the danger from chemical action that would result if I were to use some white leads.

The straight zinc coat, should have an "egg shell gloss" for the reason if it were perfectly flat such as the under paint coatings should be, it would absorb and draw the liquid properties from the enamel coat, leaving a surface of questionable uniformity.

The different coats of paint from the shellac up should be tinted as required for the finish for by so doing you get a solidity of tint that you otherwise would not. For a perfect white job we often times "draw the lead," that is we break up the lead in turpentine to a thin consistency, permitting it to stand twenty-four hours, then pour the surface liquid off and you have remaining lead practically free from oil. With the percentage of zinc oxide specified and with the use of a good white enamel varnish, or what is better a portion of the enamel as a binder reduced with pure turpentine to a working consistency, you have a ground work for enam-

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el finish that cannot be equaled, provided you permit each coat to become thoroughly dry before the application of another. For a "dead white" we sometimes give the paint a "touch" of blue or black.

If for the finishing coat an enamel varnish should be specified instead of "Prepared Enamel" (and there are a number of good ones), specify that a small portion of the zinc coat be added to the varnish for the reason that there are no good light varnishes made that will not discolor pure white and very delicate tints. A **good enamel** is expensive, but it is worth the money.

The woods adapted for enameling are cherry, birch, maple, poplar and white pine.

Note 18.— This specification if faithfully carried out will produce splendid results. For this high class work cherry, birch, or plain maple should be used; good results can be secured on white pine or poplar.

Note 19.— There are quite a number of most excellent distemper preparations on the market known by different names. The old fashioned Calcimine still retains a substantial standing, largely owing to the ease with which it can be removed when refinishing becomes necessary. It is true the former is less absorbing, but extremely difficult to remove.

There are a number of very good sizes that could be used for this purpose, but I know of no better one than a good coat of oil paint, white or lightly tinted, applied direct on the "Basic Coater." Its virtues are manifold, for instance when about 50 per cent linseed oil is used in the paint, and when thoroughly dry, it produces a splendid working surface, also a permanent sizing surface for future refinishing, the old material can be readily cleansed from it, that is if the material used will permit of its being removed.

Under no consideration use a Varnish Coating for sizing purposes, as it does not permit of any absorption and is extremely hard, in fact it is impossible to produce an even and uniform surface on a high gloss. There is also a very great tendency for the calcimine to loosen and flake off on account of the hardness of the varnish surface, which does not permit either materials to enter into it.

Note 20.— If a bright gloss is objectionable, eliminate the coat of varnish. In the third coat specify that sufficient of a good mixing varnish to produce a dull gloss be mixed into this coat and when applied it should be stippled lightly to prevent laps or brush marks.

A varnish sizing gloss coat should never be applied direct on plaster or basic coater, for the reason that it does not penetrate, but dries on the surface, creating a substantial barricade,

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which excludes and does not permit the subsequent paint coatings, to enter into the surface, and form a substantial foundation. The result of this condition being a letting go, cracking and scaling of both varnish and paint, caused by the drying out, expansion and contraction. Would recommend for a sizing a good coat of paint containing at least 50 per cent linseed oil, with no objection to 10 to 15 per cent varnish, applied direct and well brushed into the plaster surface. When "Macnichol's Basic Coater" is used, the sizing coat should positively be applied **on top** of the basic coater.

Note 21.— This formula will produce a paint practically non-absorbing when properly applied, by reason largely of the fineness of the zinc oxide closing up all voids caused by the coarser pigments, also making the film stronger and not too hard.

This formula does not produce a perfectly flat finish. By reducing the oil and varnish in the last coat and increasing the amount of turpentine we can get any degree of flatness desired. A small quantity of wax thoroughly dissolved in turpentine and added to the final coat will also produce a flat finish. Of course practical judgment must be exercised in the use of these vehicles to get just what is desired. This should be wholly left with the painter. The pigments do not enter into the question of gloss or no gloss. It must be remembered that the flatter a paint surface is the more liable it is to absorption and less its strength and resisting power to shield off surface abrasions.

If a strong gloss is desired, eliminate the stippling and apply one coat of a good wearing body varnish or a full coat of enamel evenly applied.

Very frequently for fine residences, the walls and ceilings of certain rooms are first covered with a light canvas of heavy unbleached muslin of an extra width, or with a "prepared muslin or "sanitas" especially designed for painting purposes. In that case I would specify that the walls and ceilings (designating location) be properly prepared and sized. Cover all surfaces with prepared muslin or canvas of an extra width, size same and properly glaze with lead putty all open joints, then proceed with painting as specified. The "Macnichol Basic Coater" should be used applied directly to the plaster, it acting as a preventative against discolorations that frequently appear. I would recommend when a fabric covering is used that it be applied if possible to the walls before the putting in place of wood finish, so that around the different openings the wood may cover over a portion of the fabric. Of course the plaster must be thoroughly dry.

Splendid results have been attained by covering ceiling and walls of bath rooms above tile wainscoting with prepared Sanitas, paint three

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coats, after which apply two coats of white enamel (or it may be tinted), the last coat to be rubbed with water and pumice stone to a china gloss. Care must be taken that the rubbing be uniform and not showing laps. This is very sanitary and easily cleaned.

Lately there has appeared on the market what is known as "Flat Wall Coaters." It is a paint intended for plaster surfaces. The novelty as well as popularity of these paints have also brought into the market many manufacturers of this article who have no scientific or practical knowledge of what should constitute a proficient and serviceable wall paint, but it must be acknowledged that among the many some can be found that are really proficient and are of most excellent appearance. The question at present is a perplexing one, what will be the results after repainting a number of times with the same or with a similar material applied? I personally at this time would not care to hazard an opinion. With many of them it is a new innovation both in pigment and vehicle and must speak for its self in time to come, but as I have said a number of the brands look and work splendidly, with promise of a good future. One great weakness among practically all of them is, that there is no distinction what-so-ever between the first and final coat. They are all of the one mix and sold as such, it being a commercial proposition. The last coat shows a perfectly flat film. The first coat being of the same identical composition and characteristics, is wholly unfit for a first coater, which to be proficient must penetrate into the plaster, which by nature of its composition it will not, simply drying on the surface. The result will be shortly a breaking away from the plaster surface with scaling and flaking. Nor has any precaution been taken to protect the vehicle and colors from the destructive alkali found in the plaster and cements, which is most deteriorating to both of these essentials. Therefore I would most earnestly recommend that all plaster and cement surfaces be first coated with "Macnichol's Basic Coater," allowing twenty-four hours to dry, and for the **first** coat of all prepared "Flat Wall Coaters." I would also add one-quarter gallon of linseed oil with a little dryer. That would cause the paint to penetrate into the plaster, forming a substantial foundation for subsequent coatings, with all danger of discolorations and deteriorating of vehicle and colors eliminated.

Many of these "Flat Wall Coaters" are here to stay, therefore the necessity of painter and manufacturer getting wise as to their proper use.

The stippling of paint should be done very lightly, simply an evening up as it were for the purpose of getting a uniform even surface. Coarse stippling should be avoided as it is most unsanitary, it providing a lodgment for microbes, etc., among the surface abrasions caused by

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heavy stippling, also by reason of the difficulty in thoroughly cleansing, owing to its coarseness. I would recommend the abolishment of the interior style of plastering known as "sand finish" for the above reasons.

Many large office buildings hastening to completion require of the painter that he proceed with the painting of plaster and cement surfaces, when they are still in an undry condition, often times quite wet. Such demands are ruinous to future good results. A paint used over the above conditions at best is but temporary and **must not** contain any varnish, very little oil and no zinc oxide. It must be as soft as possible to permit the dampness to exhale through the paint to the surface. The alkali being still active owing to excess of dampness staining blistering and peeling of the paint is a sure result.

Note 22.— If the location of the finish justifies additional expense and a flat surface is desired, specify that the last coat of varnish be lightly rubbed with oil and pumice stone to a uniform dull finish, thoroughly cleansing surface from all oil and pumice stone. In servants' portions of residences this is not justifiable.

This specification pertains to all open grained woods such as oak, ash, chestnut, black walnut, etc. If cherry, birch, maple and such woods are used, frequently the filling with paste filler is eliminated, the shellac coating filling requirements. In my own operations I invariably use the filler as specified, but quite thin in body, carefully wiping off filler from surface. For birch stained in imitation of mahogany I always omit the filler, shellacing direct on the stain, as frequently chemical action takes place when oil is brought in direct contact with mahogany stain used on birch.

Note 23.— This specification applies to the finishing of red or white mahogany, cherry, birch, walnut, rosewood, etc.

Frequently in finishing mahogany or other woods stained with a water stain in imitation of mahogany or otherwise, after lightly sandpapering the stain, I apply a light coat of shellac direct on the stain, sandpaper lightly, then proceed with the filler and varnish as specified. White shellac should never be used on dark mahogany or mahogany stained, as it will in time bleach out white, showing a milky film under the varnish. I also frequently omit both the shellac and filler, applying direct to the stain a coat of linseed oil reduced one half with turpentine containing a little dryer. After this has remained on for some time, wipe off carefully any oil that may remain on the surface, allow that which the wood has absorbed to get perfectly dry, then proceed with the varnishing as specified. In this latter case four coats of varnish should be applied.

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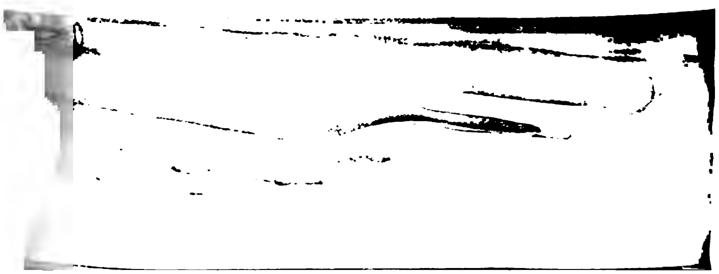
For white or birds-eye maple, holly, satin wood, etc., eliminate the filler and stain, specify two coats of pure grain alcohol **white** shellac and three coats of an extra pale varnish, designed for this class of work, rubbing and finishing as specified. In bringing oil into contact with these and similar woods it has a tendency to darken, whereas the purpose is to keep them as light and natural as possible.

For Italian or French walnut, circassian walnut and similar woods, where it is so important that the natural colors and shading be preserved, eliminate the filler and apply as above two coats of pure grain alcohol white shellac and three coats of a light varnish, rubbing and finishing as specified.

Fine carved work should never be varnished and rubbed as specified. Specify stain if necessary to conform with balance of wood, apply one light coat of shellac and two thin coats of wax, rubbed to a hard surface with stiff bristle brush. One medium or light coat of a good flat varnish in place of the wax will answer very nicely. The filler with the several coats of varnish will have a tendency to filling up and rounding the sharp edges and clean cutting so desirable in good carvings.

Note 24.— This specification will apply to oak, ash, chestnut, mahogany, cherry, etc. If a finish with open wood pores is desired, eliminate the filling, but add one additional coat of wax.



Note 25.— This specification applies to oak, ash, chestnut, red and white mahogany, cherry, black walnut, etc., and calls for splendid results. A water stain is mentioned, it being the best and most satisfactory in showing up to advantage the general beauty of the natural shadings and figure of the woods. In staining it should be emphasized that it does not mean a covering up, but rather the bringing out. In oil stains the coloring matter is largely composed of pigments of a different character and as a rule they are permanent, but they have a strong tendency to cover up. Spirit stains are hard to apply and the results unsatisfactory, the coloring matter very often being fugitive. Where it is possible to attain the color requirements by the use of a water stain, and their number is legion, I would recommend it above all other. All water stains raise the grain of the wood more or less, spirit stains very little and oil stains practically none. In connection with the use of water stain I specify an application of clear water to the oak wood direct (in my practice I find no harm to a good job of cabinet work accruing from its use), so that the surface particles may be raised, and then cut off with sandpaper so that the application of the water stain has no tendency to farther raise the grain. When the water coating is not used and the water stain is applied directly it requires so much sandpapering to recover again a smooth surface that

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much of the stain and its effects are removed by the sandpapering. The water coating is very frequently omitted on less important work. When oil and spirit stains are used the water coat should be omitted, for other than oak wood it may also be omitted in the use of the water stain.

Very frequently to get desired results I apply a light coat of shellac direct on top of stain, after which I proceed with the filling as specified. I also frequently eliminate the shellac coating from on top of filler, applying wax direct on filler. The results desired must regulate the procedure.

When an open grain or pore effect is desired omit the filler, but add one additional light coat of shellac. It is very essential in this class of work that the shellac be applied thin and even, showing no laps or brush marks. If a perfectly flat or dead finish is required omit both filler and shellac coatings, waxing as specified direct on the stain, although I would recommend the one coat of shellac. If the natural colors of the woods are to be retained omit the staining and proceed as specified and observing above notes.

For white and birds-eye maple, satin wood, holly, French, Italian and Circassian walnut or any other similar woods, when required to be finished showing their natural colors, eliminate the water coat, stain and filler, specify two thin coats of pure grain alcohol **white** shellac evenly applied direct on the wood without showing laps or brush marks, sandpapering thoroughly each coat, then proceed with waxing as specified. When well done this will give splendid results. Frequently mahogany and other woods than those specified above are finished after this manner. It is not unusual in procuring results to eliminate the shellac coatings, waxing as specified direct on the raw wood. When stain is necessary apply wax direct on same.

Often pleasing results can be obtained by using a first class dead or flat varnish. For instance if a perfectly dead finish is required on open pore surfaces, after applying the stain, sandpaper and apply one thin coat of shellac, sandpaper lightly and apply one coat of a good flat or dead varnish, eliminate the waxing. To get a still flatter effect eliminate the shellac also. This process is not recommended for durability, simply for its effect, and should only be used on open pore woods such as oak, where the broken effect of the wood surface destroys the varnish coating effect. In this window sashs and sills should be protected with a coat of good body varnish, when dry the gloss can be removed by rubbing.

26 **Note [redacted].**— This specification applies to white and yellow pine, also to maple. If this class of flooring is required to be stained, specify instead of the shellac, floors to receive one coat consisting of 25 per cent linseed oil and 75 per cent

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turpentine, sandpaper and close up all imperfections. Apply one coat of stain consisting of 40 per cent linseed oil and 60 per cent turpentine, evenly brushed into the wood, color to be selected. Follow this with varnish as specified.

The so-called "Liquid Fillers," that is prepared fillers sometimes used to coat over the surface and permitted to remain there without rubbing off, should never be used, for the reason that they do not dry thoroughly throughout. Many of them also have a tendency to discolor the wood, especially when they begin to bleach out by reason of age, etc.

The object in going over this work with a very thin coating of oil and turpentine is, that if you were to apply the stain direct to the wood the result would be a clouded or mottled surface, owing to the natural characteristics of these different woods to absorb more in one sport or place than in another. Very little if any stain should be left on the surface. It should be absorbed uniformly by the wood, and be thoroughly dry before the application of the varnish coatings.

Where a dull finish is required, specify to be rubbed lightly with oil and pumice stone to a dull finish. A dull or flat varnish should never be used on floors.

Note 27.— Very frequently the color desired for these floors can be obtained by adding necessary coloring matter to the filler. The color of the shellac (white or orange) should be determined by the color required.

If a flat finish is desired, specify to be rubbed with oil and pumice stone to an even dull surface. A dull rubbed surface does not show surface scratches or abrasions as readily as a bright varnish gloss. Under no consideration use a flat or "dead" varnish to procure this result.

For first class results you may eliminate the shellac coating and substitute one additional coat of varnish. It is very essential for best results that each coat be thoroughly dry before the application of another.

This style of finish is suitable for residences. but proper care must be exercised that it be not abused, for at best a varnished floor surface from the nature of it is more or less fragile.

Note 28.— This specification applies to practically all class of flooring woods and produces splendid results as a wax finish, being easily cared for by the house keeper simply going over the surface lightly with turpentine removing any surface dirt or imperfections, after which repolish with one coat of wax as specified. Especial care of the floor should be observed in front of the different doorways, as that portion receives the greatest amount of wear.

The whole secret of the success in obtaining a thoroughly practical waxed floor finish, is the recognition of the necessity of using a known good "Floor Wax." Then thoroughly hard-

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en each coat with the friction caused by good honest hard rubbing.

This manner of finishing as specified, while it produces the best appearing wax finished floor, has that which oftentimes is an objection, it being quite "slippery." To remove in a large measure this objection eliminate the coat of shellac from the specifications.

For dancing or ball room floors, I would apply the two coats of wax direct to the wood, of a necessity the wax must be good and the rubbing hard, allowing two days between coats.

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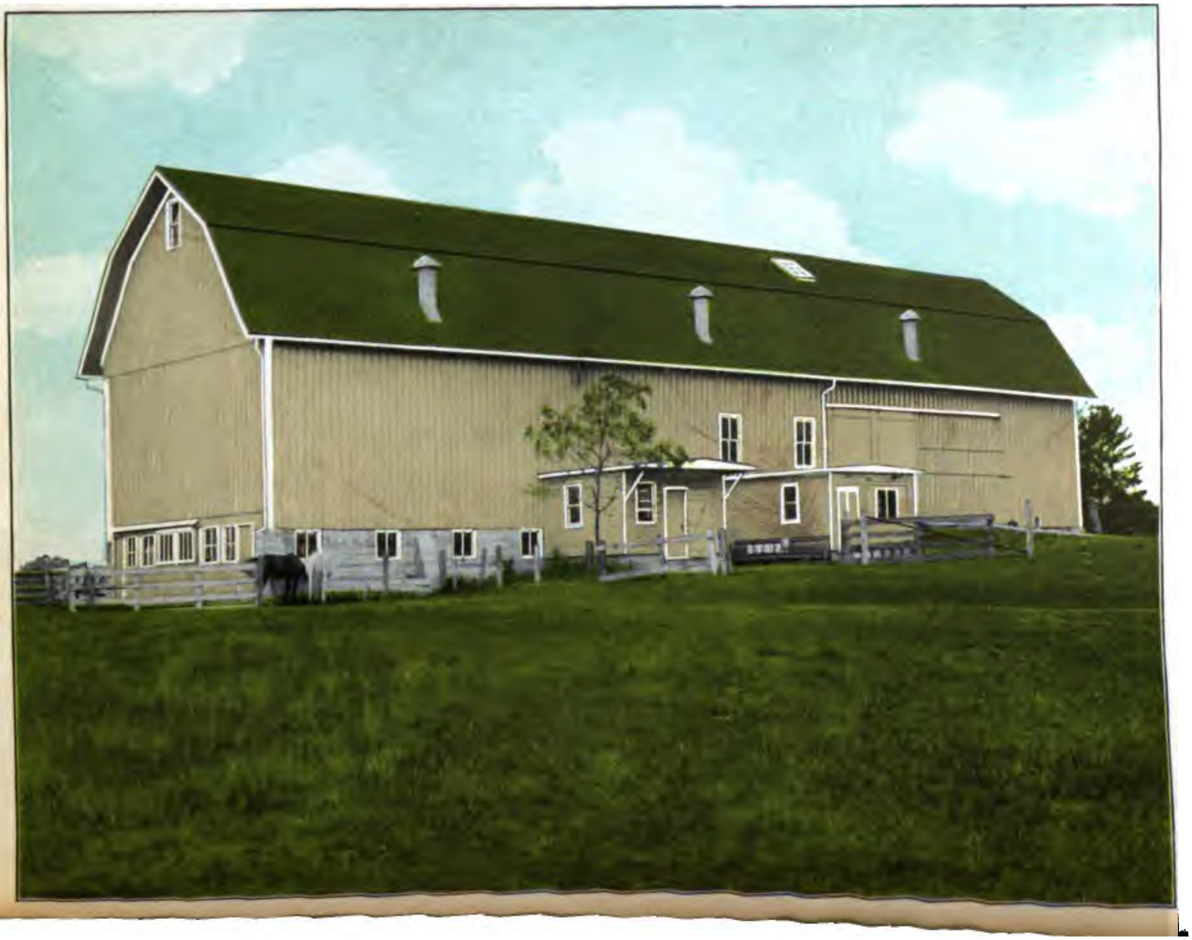

NUMBER
16 L

Body—
French Gray

Trim—
White

Roof—
Green

**Carter
White Lead
Company**

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SLEEPECK-HELMAN PRINTING CO
CHICAGO

Light tints are prettiest when made with a perfectly white base—Carter White Lead.

ALMOST any light tint would look well on this house. It is important, however, that the plaster frieze also be kept light in tone as the house is rather low and a dark brown or green on the frieze would make it appear still lower.

The French gray suggested for the body is a very satisfactory color, as it is produced chiefly with raw umber, made darker to suit the taste with lamp black.

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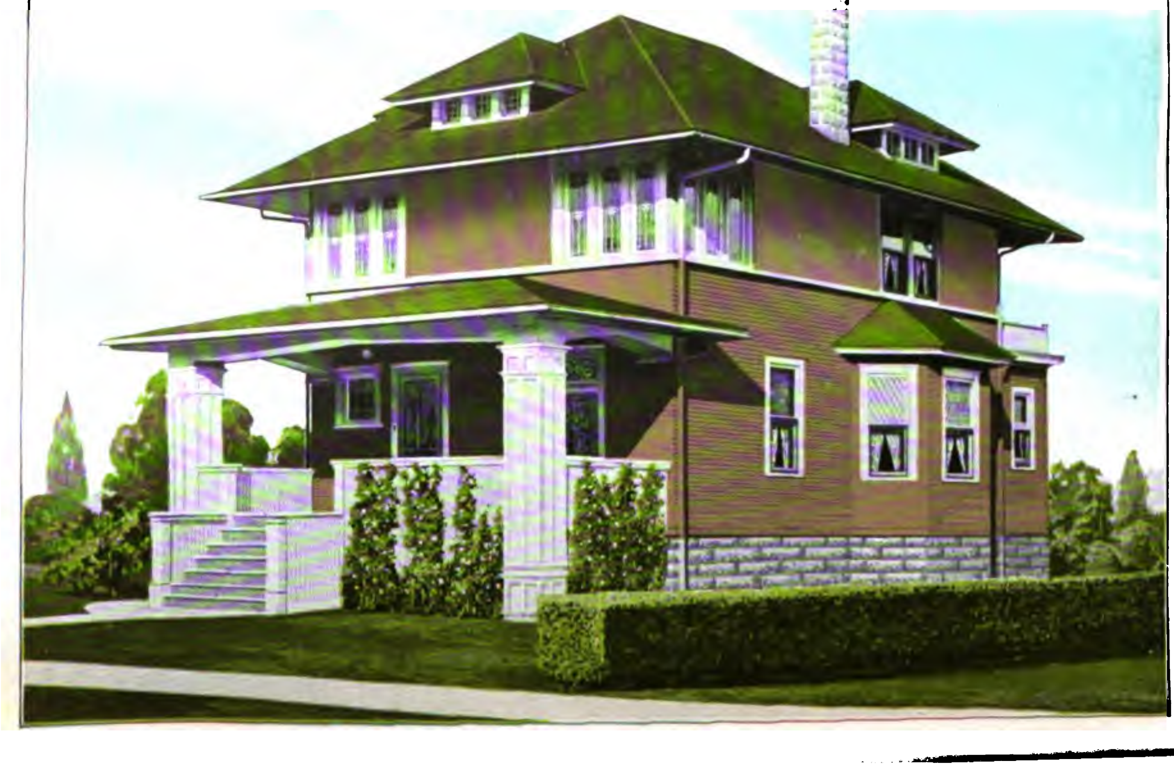

NUMBER

16B

***Body*—**
Raw Umber Tint

***Trim*—**
White

***Roof*—**
Moss Green

Carter
White Lead
Company

No cracking and scaling when a house is painted continuously with pure lead and pure oil.

THE location and atmospheric conditions may pretty well determine the color to be used on a square house of this type. As far as architecture is concerned, almost any color would be appropriate. As this style of house is very frequently found on narrow city lots, where atmospheric conditions are hard on paint, a color has been chosen that is exceedingly durable and that does not show dust and smoke. This particular shade is not arbitrary. Card No. 4, of the "Carter Master Painters Color Pack," shows six different shades that may be produced with raw umber and Carter White Lead. If one of the darker shades were selected for the body, a very light umber tint would make an appropriate trim color, which would not soil as quickly as white.

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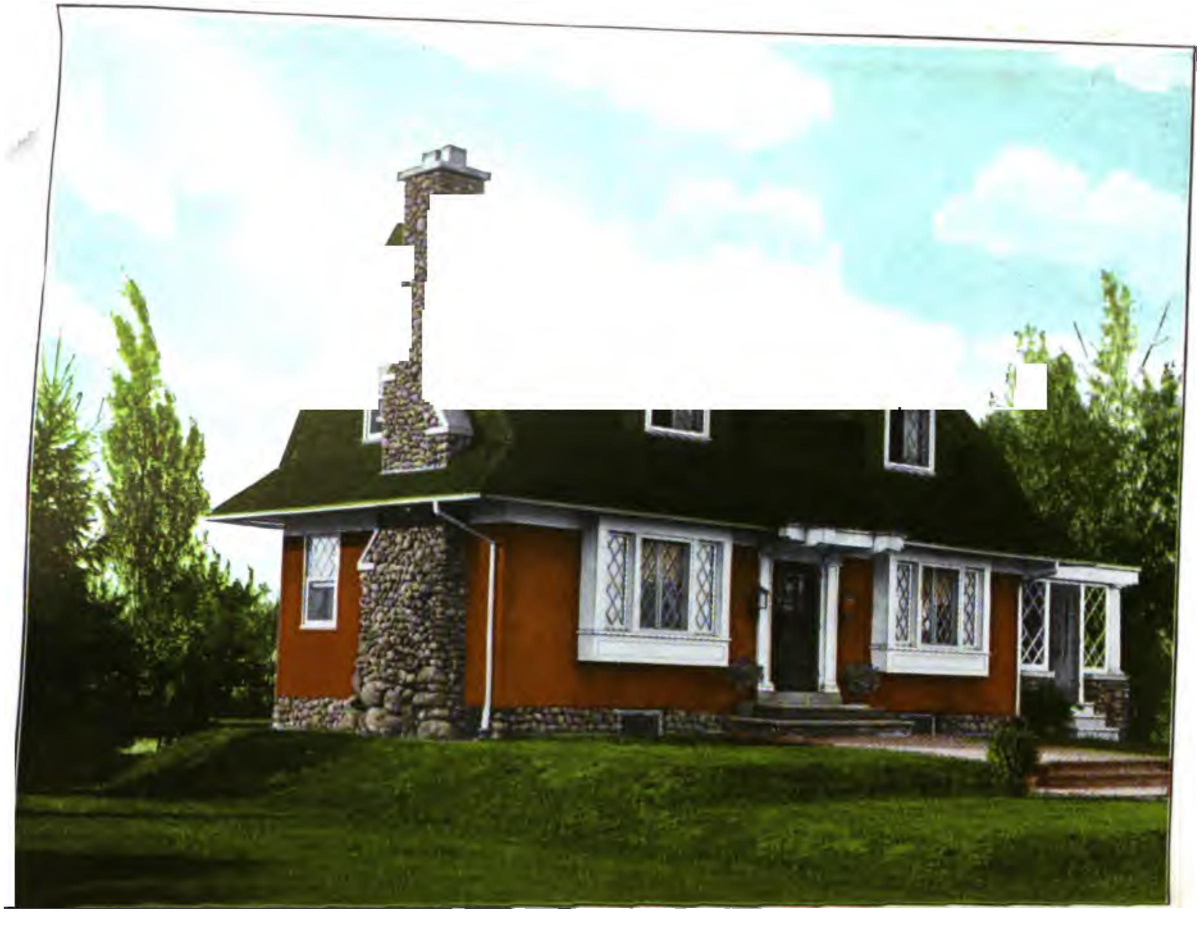


NUMBER
16A

Body—
Light Tan

Roof—
Moss Green

Trim—
White

Carter
White Lead
Company

THE PAINT BEAUTIFUL

Pure White Lead;
Pure Linseed Oil;
A Skilled Painter—
That's all you need
to know about paint.

FOR a plaster body, some shade of brown or green naturally suggests itself. Brown is preferred because it is difficult to get a green that will not change color. The tan shade that is here shown is made with about one part raw sienna to three parts white lead. Different shades of tan and brown may be produced by varying the proportions.

On this house, or any other where the roof is a prominent architectural feature, it should be painted. Green is a very satisfactory color for shingles, and a mottled appearance as the paint grows older is not objectionable. If green were to be used for the body of the house, maroon paint for the shingles would be appropriate. No matter what color is used on the body and roof, the trim should be white or some very light tint.

Use Trim and Body Colors Judiciously

Although pleasing colors have been selected it often happens that the finished effect is disappointing because the colors have not been placed to best advantage.

When painting houses that are rather plain and devoid of architectural ornament, it is well to look for cornice mouldings, panels in square columns, frieze boards, column caps and bases, and other details that may be painted with the trim color. On the other hand some houses have an extra amount of ornament in the way of grills in the gables, lattice work, fancy cornice brackets, elaborate balustrades and shingle belts. Every detail painted with the trim color is made more prominent; to overcome the effect of over-decoration, use the body color as freely as necessary on this ornamental work, especially on features that might better have been omitted when building the house.

A practical way to work this out is for the houseowner and painter to view the house from all angles as soon as the first coat has been finished. Then it is an easy matter to paint over in the opposite color any places where the colors were not used to best advantage at first.

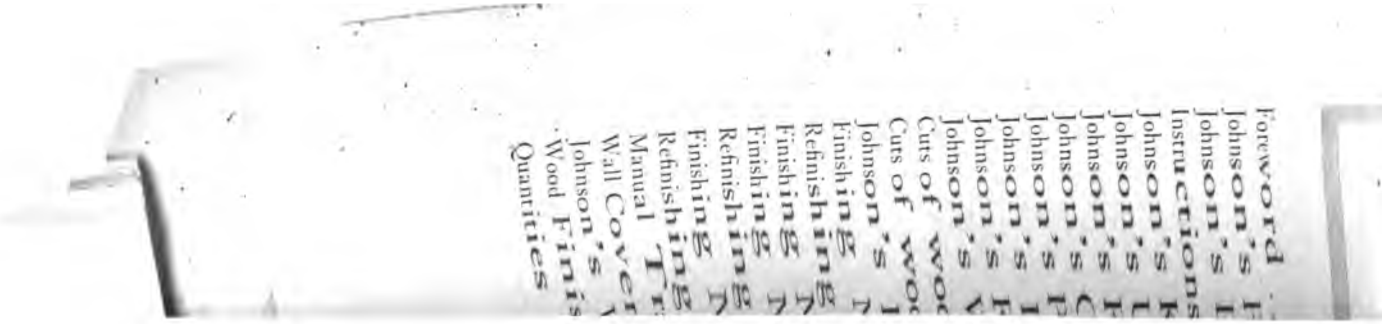
CARTER WHITE LEAD CO.
CHICAGO ILLINOIS

Three Important Things in Selecting Colors

Atmosphere: White or light tinted paint will become dirty quickly in large cities where soft coal is the fuel chiefly used, or in proximity to factories where the air is full of smoke and dirt. In such localities darker shades are preferable unless one is willing to paint one coat every year which is, after all, the best way to keep a house always at its best. Many compromise by having their houses painted a dark body color with a lighter trim which can be painted frequently at small expense.

Surroundings: A house standing on a large lot, with trees and shrubbery around it, can be painted any color that does justice to its architecture and meets atmospheric conditions. Here white and the lighter tints are usually in order. Where houses are built closely together, and especially if similar in design, each house should be painted so it may be readily distinguished from its neighbors but should not be too strongly in contrast with them.

Architecture: Having dropped from consideration the colors that atmospheric conditions or surroundings forbid, it then becomes a question of choosing colors that will suit the size and shape of the house and the materials out of which it is built. For the principles that should govern you are referred to the color plates each one of which is a photo-engraving of a real house painted in good taste.



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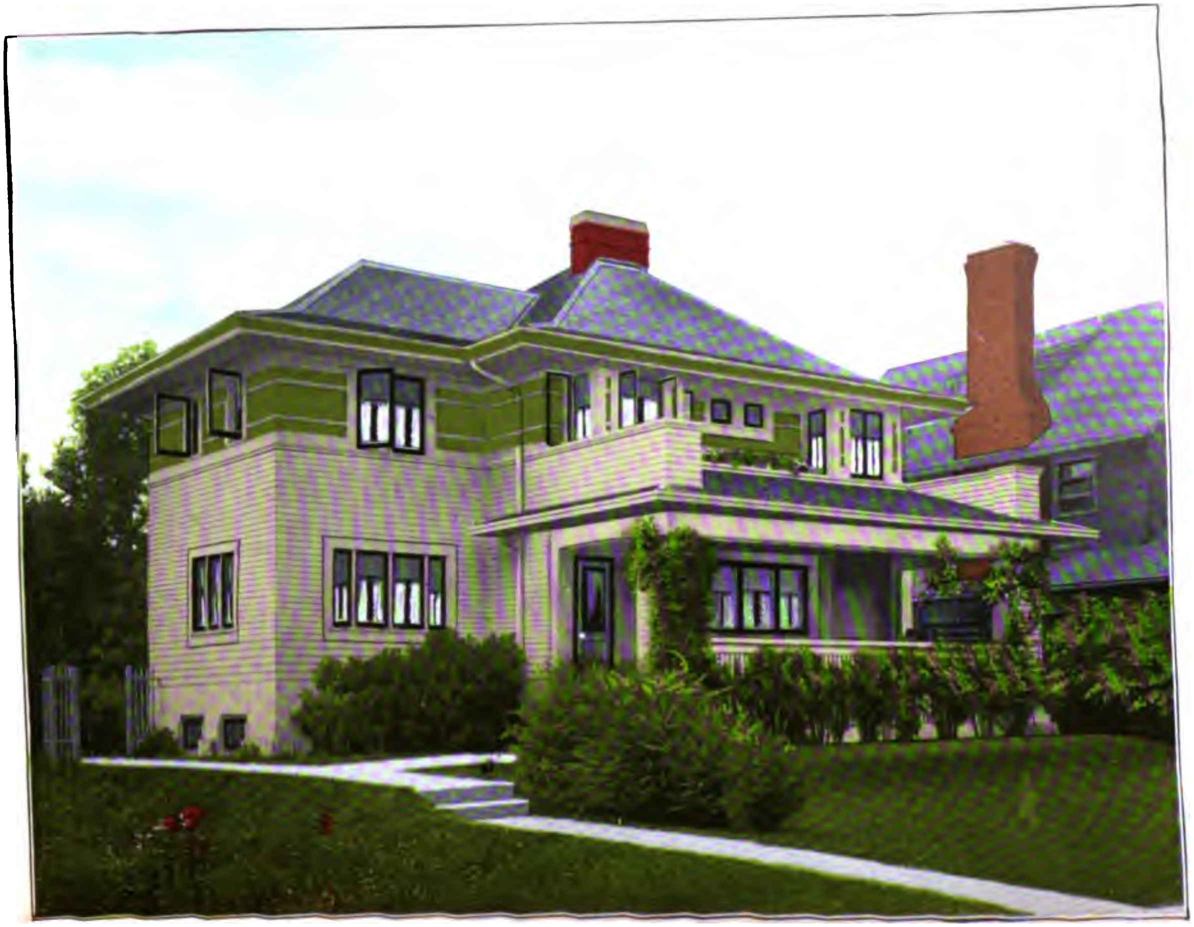
THE PAINT BEAUTIFUL

When something as good as pure linseed oil for outside painting is found it will be recommended by the Carter White Lead Co. Nothing else to suggest yet.

A HOUSE of this pure colonial type should never be painted anything but white. It is seldom found except among trees and shrubbery and on large lots; hence there is seldom any reason for painting anything but white.

The owner of such a house usually and properly takes pride in its appearance. He wants a perfectly clear, pure white paint and this is found in Carter White Lead. It is not necessary to add anything to Carter to make it white enough to suit the most exacting. Carter is "The Right Paint for White Houses," no matter what their architecture or location.



NUMBER

16C

***Body*—**
French Gray

***Frieze*—**
Medium Olive

Carter
White Lead
Company

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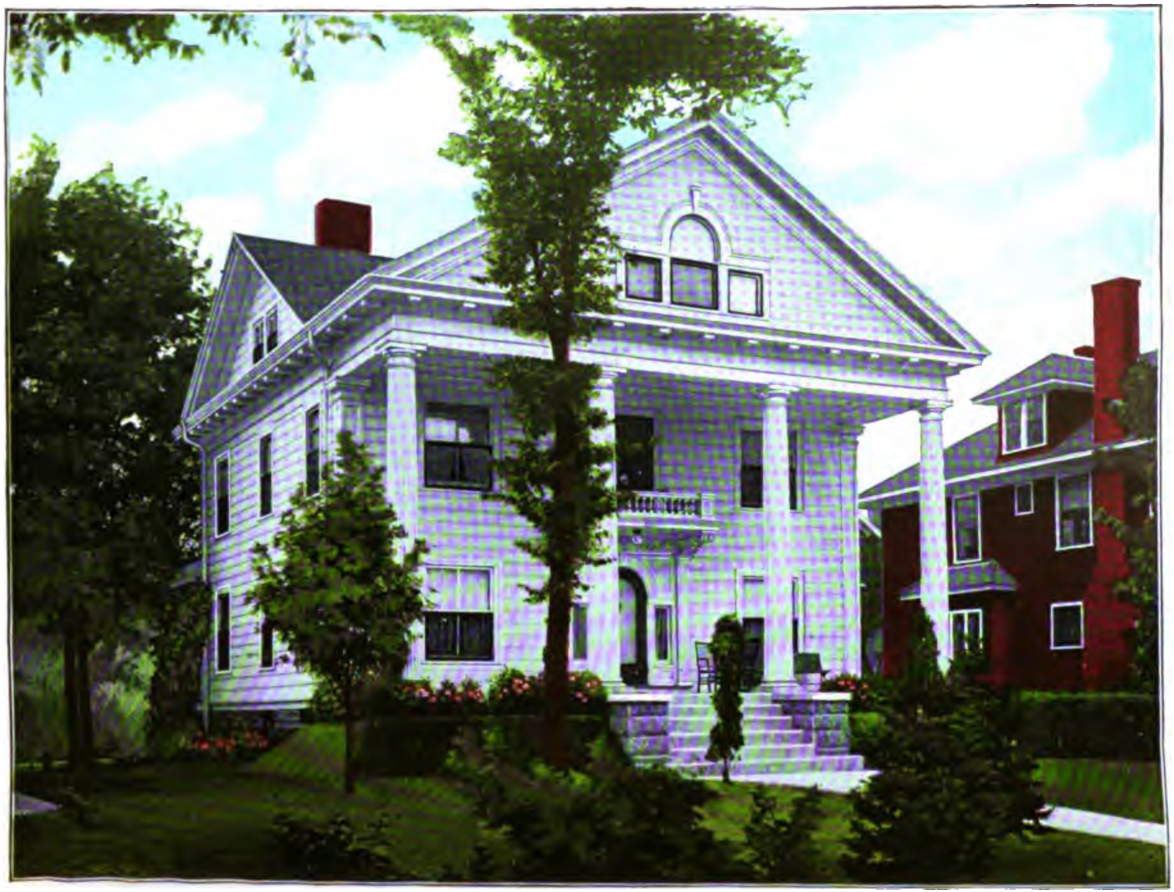
When something as good as pure linseed oil for outside painting is found it will be recommended by the Carter White Lead Co. Nothing else to suggest yet.

A HOUSE of this pure colonial type should never be painted anything but white. It is seldom found except among trees and shrubbery and on large lots; hence there is seldom any reason for painting anything but white.

The owner of such a house usually and properly takes pride in its appearance. He wants a perfectly clear, pure white paint and this is found in Carter White Lead. It is not necessary to add anything to Carter to make it white enough to suit the most exacting. Carter is "The Right Paint for White Houses," no matter what their architecture or location.



NUMBER

16D

***Body*—**
White

***Trim*—**
White

Carter
White Lead
Company

Foreword
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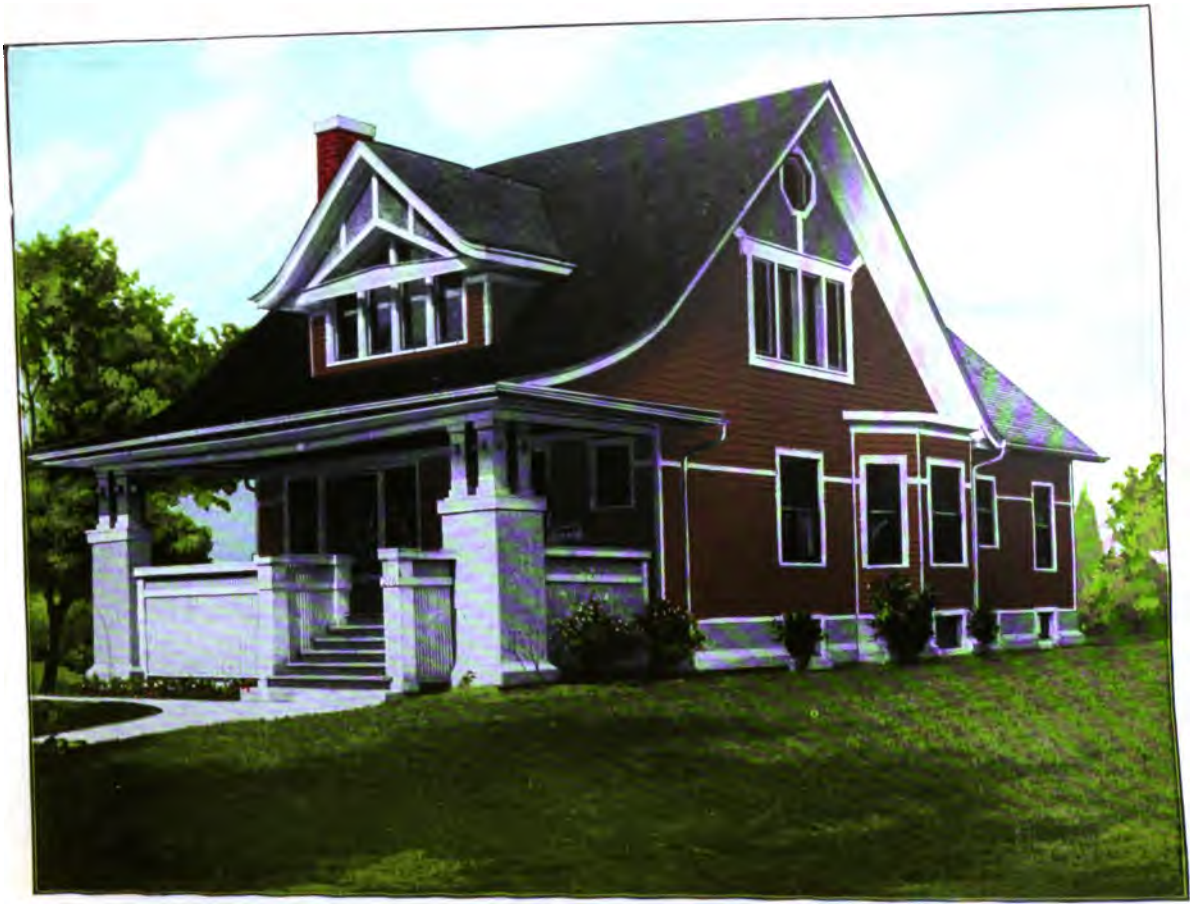
THE PAINT BEAUTIFUL

While one coat of Carter White Lead may cover so well that it looks well, two coats are necessary to wear well. Don't skimp.

THIS cottage, the original of which stands in a Chicago suburb, has been duplicated in hundreds of other places—usually on narrow lots and closely surrounded by other houses. It has been painted in numerous combinations, but none has proved so satisfactory as this light brown, trimmed with pure white. In producing this color, raw sienna is the dominating pigment, white lead being added to make the color as light as individual taste demands.



NUMBER
16E

***Body*—**
Light Brown

***Trim*—**
White

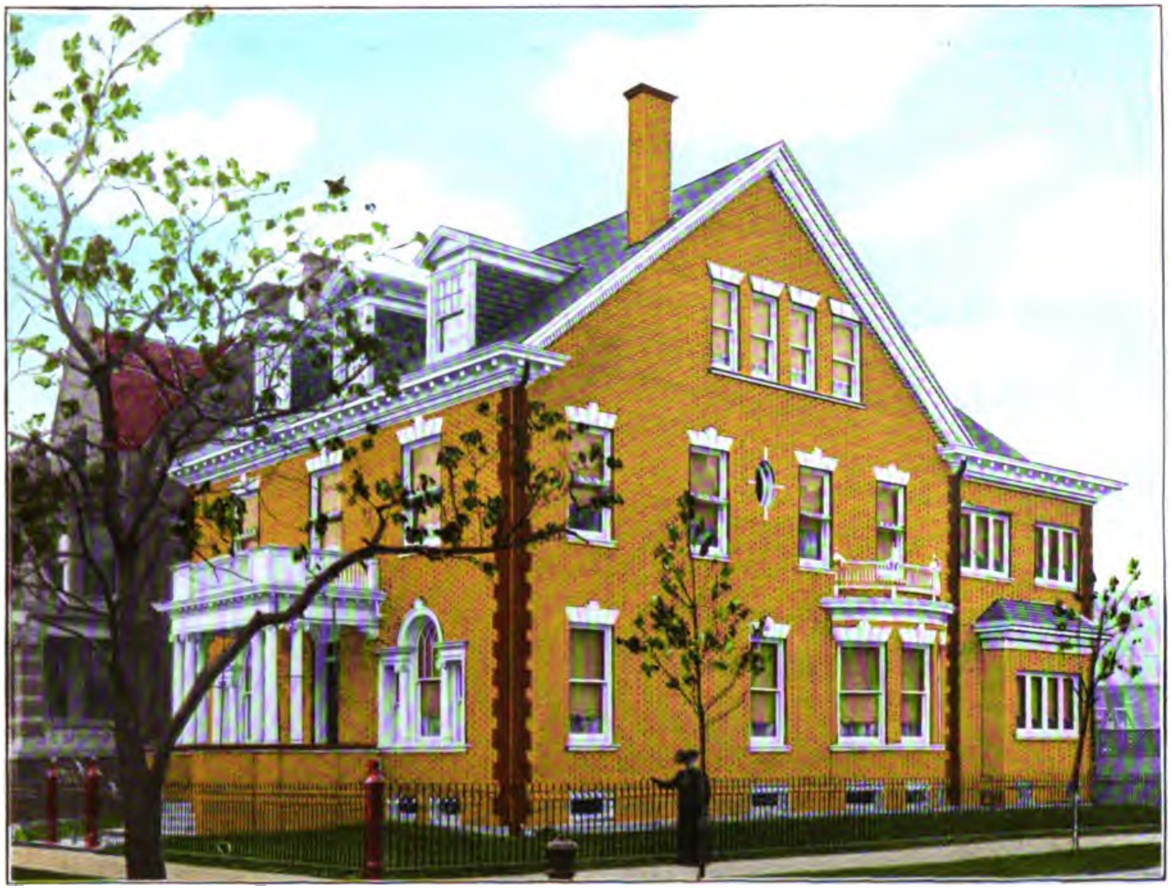
**Carter
White Lead
Company**

The services of a good painter are worth much more than their labor value. "Know-how" means much on a job of painting.

HOUSES of this type will be found in all of the older settled communities, although many of them are much smaller than this one.

When common red brick becomes weatherbeaten and unsightly, its appearance can be wonderfully improved by painting, and as the universal desire is to get as far away as possible from red brick color, a colonial yellow is most frequently selected.

A warm or medium drab is less conspicuous and is very satisfactory when relieved by pure white trim. On this house, the painter was able to use a third color to most excellent advantage.



NUMBER
16F

Body—
Colonial Yellow

Trim—
White

Corner Brick—
Light Brown

**Carter
White Lead
Company**

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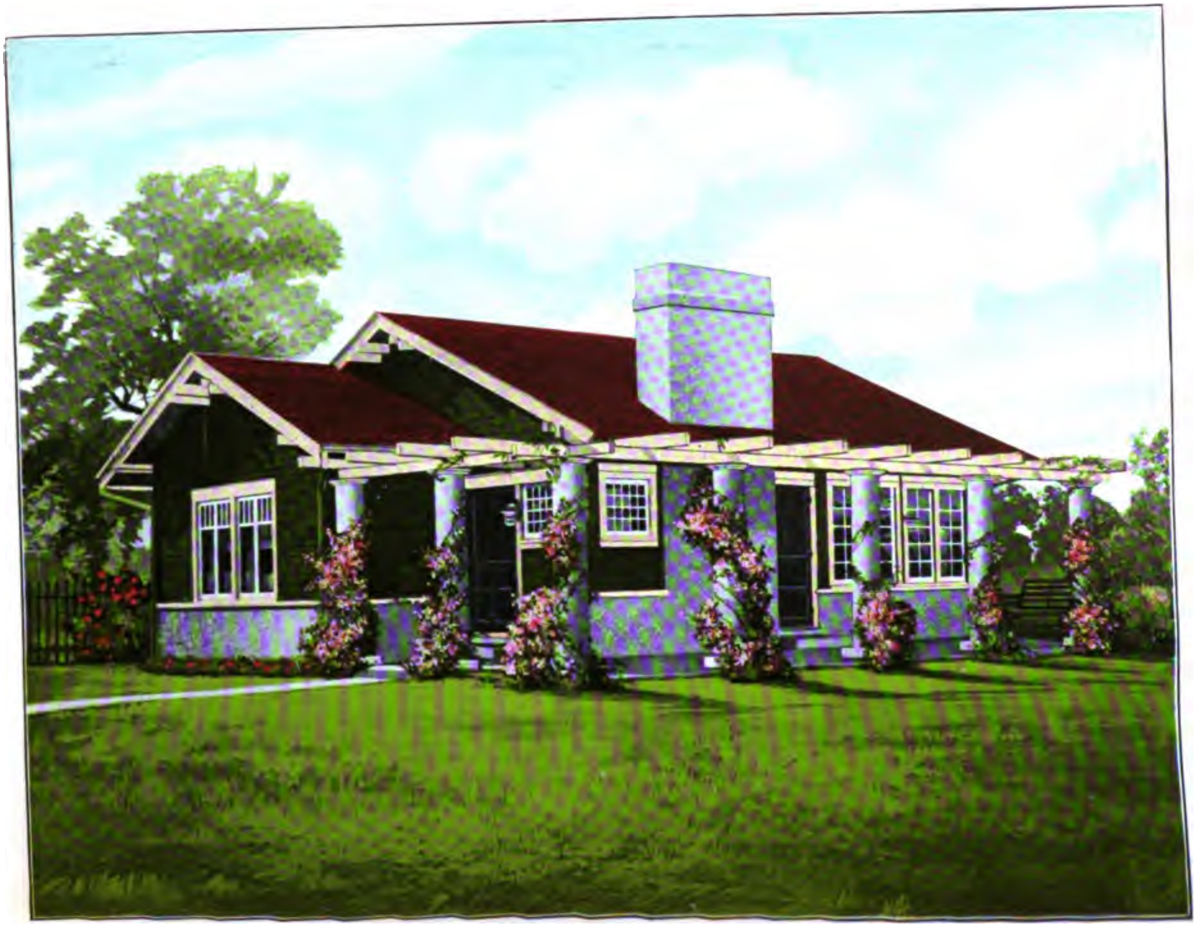
THE PAINT BEAUTIFUL

Paint troubles are ended when the use of Carter White Lead begins.

THE architect displayed unusual taste in designing this cottage to fit into its surroundings. It stands on a high, terraced lot, where a house full two stories to the eaves would have appeared tall and ungainly. It would be so difficult to find another color scheme that would fit this house and its surroundings so well that an alternative choice is not even suggested. An ivory white body with pure white trim is in good taste on almost any small cottage. The light tints increase its apparent size and carry out the idea of hominess and informality in a charming way.



NUMBER
16G

***Body*—**
Medium Olive

***Trim*—**
Ivory

***Roof*—**
Maroon

Carter
White Lead
Company

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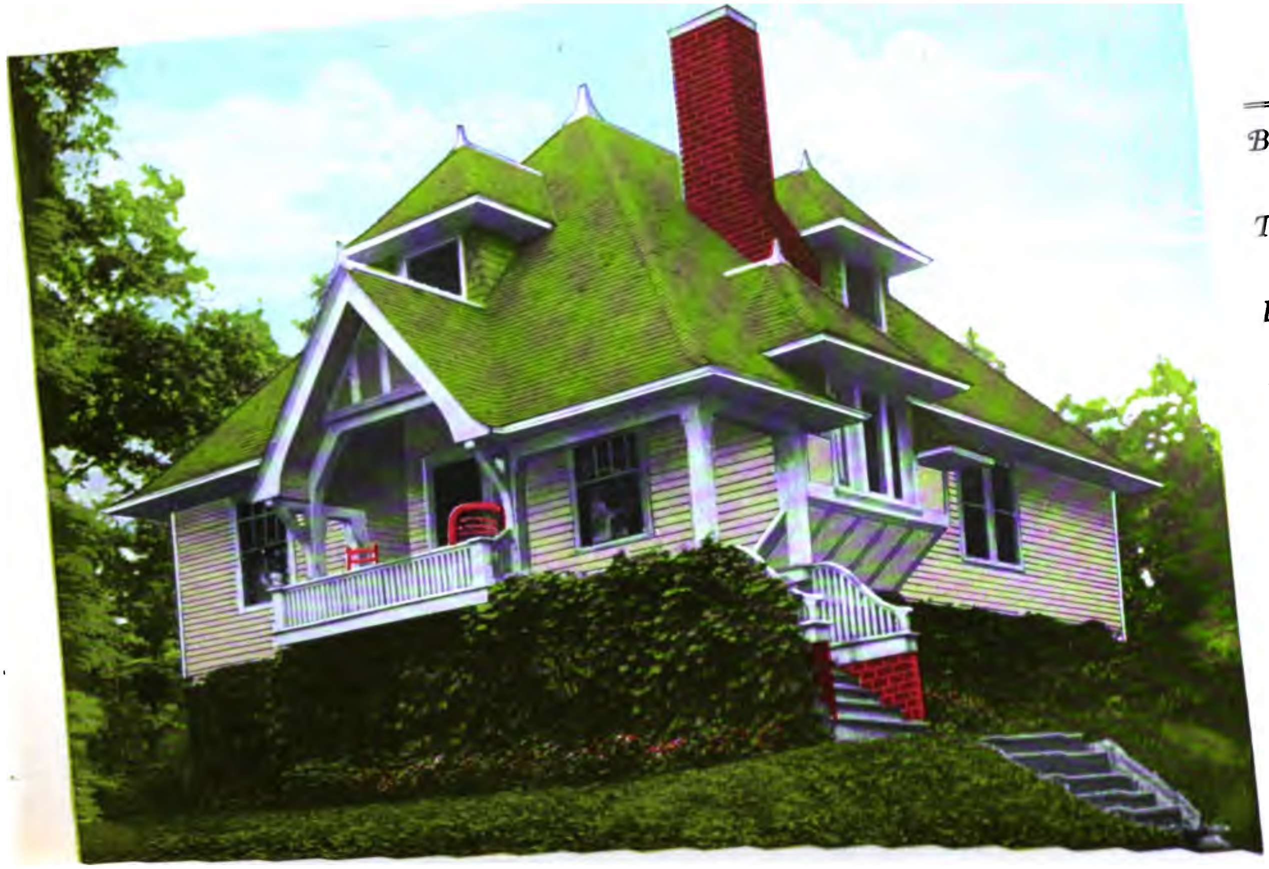

NUMBER

16H

Body—
Ivory

Trim—
White

Roof—
Medium Olive

Carter
White Lead
Company

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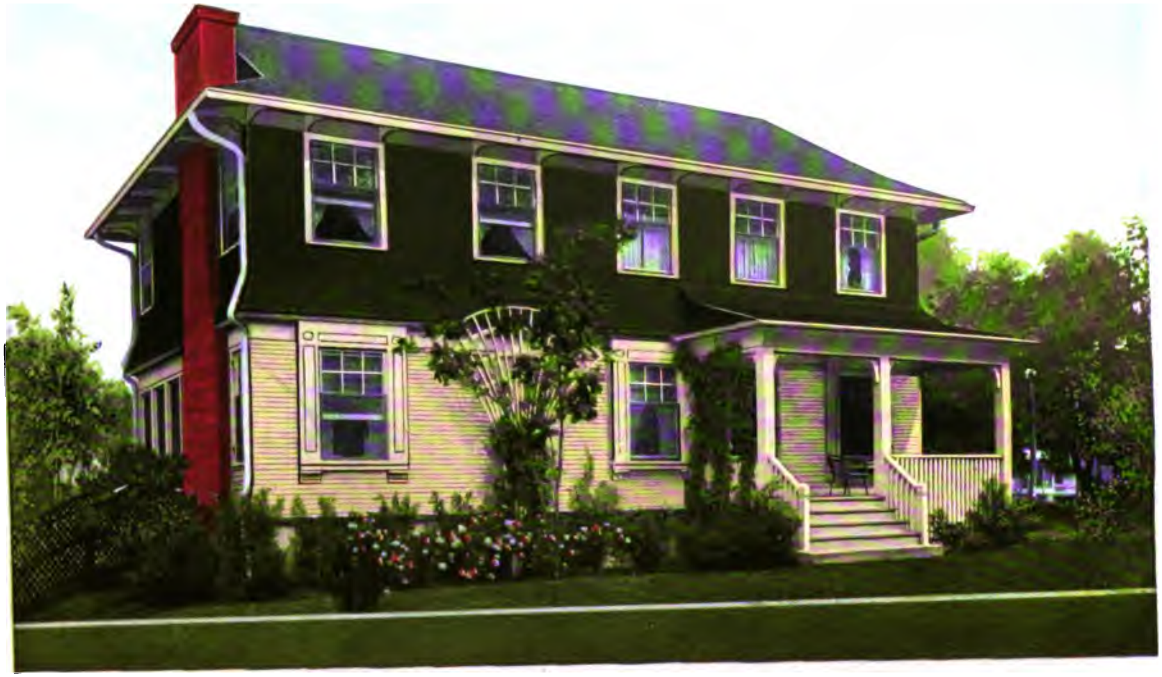
THE PAINT BEAUTIFUL

Nothing is put in Carter Lead to make it white. It's so white because it's so pure.

A BEAUTIFUL suburban home—on a large lot with plenty of trees and shrubbery—which the architect designed to be painted white and for which tinted paints should never be considered.

When one drives along a country road or village street and compares the general attractiveness of houses that are painted white with those on which the darker colors have been used, he will find that on the average the white houses look like much more desirable places in which to live. This argues for a wider use of white paint, especially on old houses where decoration was not considered in construction. Such houses usually have sufficient trees to afford the proper setting and white paint goes far toward obliterating the ravages of time.

12



NUMBER

161

Lower Body—
Cream

Upper Body—
Moss Green

Carter
White Lead
Company

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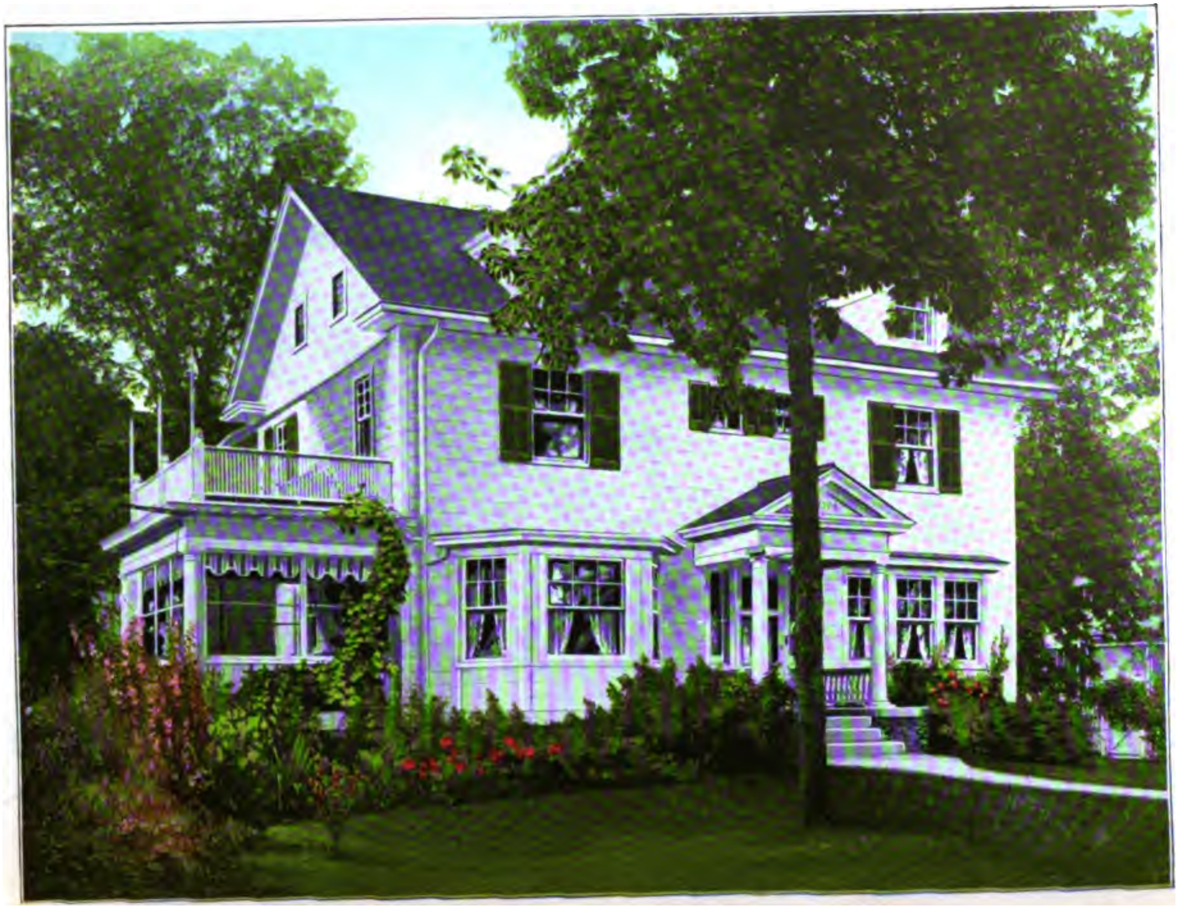

NUMBER

16 J

***Body*—**
White

***Trim*—**
White

***Blinds*—**
Moss Green

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Don't be misled—
everything branded
"white lead" is not

THE color scheme shown opposite illustrates a principle that can be almost universally employed where there is a barn or garage on the same lot with the house, whether it

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TO FINISH
BRITISH
OLUMBIA
WOOD

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

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THE PAINT BEAUTIFUL

Few people will dispute that there is as satisfactory a paint for a house as lead and oil. It is equally desirable and economical and trustworthy for a barn.

THE red and brown barn paints are fast going out of date. Light colored paints for barns first found favor in the dairy districts where cleanliness and sanitation were the first consideration. While the color of the paint on the outside of the barn has no necessary connection with the cleanliness and order maintained inside, it does have an unconscious effect upon the visitor and passer-by—also, perhaps, on the Dairy Inspector.

The change has, however, made such a wonderful improvement in the general appearance of a group of farm buildings that it is being adopted almost everywhere.

While no fault can be found with the wearing qualities of a red or brown paint made of a pure oxide of iron pigment and pure linseed oil, such paint is hard to find and is expensive. There is, therefore, little or no economy even in first cost in using anything other than a pure lead and oil paint and when this pure paint is properly and skillfully applied it will be found most economical in the long run.

HOW TO FINISH BRITISH COLUMBIA WOOD

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

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HOW TO FINISH BRITISH COLUMBIA WOOD

THE GOVERNMENT OF
THE PROVINCE OF BRITISH COLUMBIA

How to Finish British Columbia Wood

THE growing scarcity and increasing cost of the many hardwoods that have been used in the past for interior finish and cabinet-work have caused a world-wide search for materials which will take their place and at the same time lessen the cost of construction. Many British Columbia woods have been found to be exceedingly well adapted for this purpose. Douglas fir, western hemlock, red cedar, spruce, western larch, and mountain western pine in particular have recently come into prominence as finishing material of exceptional worth.

Wood excels all other materials used in the construction and finishing of any building, be it cottage or mansion. No other material combines such naturally beautiful effects with the wearing and sanitary qualities of wood, and no other is so universally used. Again, wood is the most easily handled material that man has; with simple tools it responds to the craftsman's skill and shows its beauty in many and varied forms. The superiority of wood over the manufactured materials for covering walls, floors, and ceilings is apparent to all who value the beauty and cleanliness of a polished floor, the quiet dignity of a panelled room, or the old-world, home-like appearance of a beamed or panelled ceiling.

Western woods are remarkable for their excellent wearing and time-resisting qualities. They have a beautiful figure and are especially suitable for inside and outside finish. Two entirely different styles of figure are possible. From lumber sawn flat-grained is obtained a beautiful watered-silk effect, and from that sawn vertically a restful, pleasing edge-grained effect. A cedar panelled room finished in wax polish with an edge-grained Douglas fir floor, natural shade, is a delight to behold, combining as it does comfort, beauty, and durability.

Wood improves in appearance with age. Plaster for walls in many cases is but a cheap and inefficient substitute for panelling or other form of wood covering; it is easily damaged, difficult to repair, is almost impossible to clean, and requires periodic decoration to give a presentable appearance. Wood has none of these disadvantages. Keep your floors and panelling clean and their beauty and usefulness will be more apparent every day. The various finishes, oil, stain, varnish, or polish, on woods serve to bring out the grain, protect the surface against wear, and enable it to be easily cleaned. The following suggestions for the finishing of British Columbia woods have be

Finish.

All wood intended for high-class finish should be thoroughly dry and free from gum, checks, sap, or knots. It should be milled in the best possible manner, and left perfectly smooth and free from scratches and plane-marks. Wood prepared up to this standard does not always require sandpapering before being stained or otherwise finished. In many cases, however, the mill does not finish the wood surface properly, and it will pay to dress the surface further with the hand smoothing-plane and fine sandpaper. If this is necessary, care should be taken to sharpen the hand-plane iron correctly so as not to leave ridges in the surface of the wood. A steel scraper may be used instead of the hand smoothing-plane in the case of woods of hard nature. The finishing of wood surface by hand smoothing-plane or scraper applies most particularly to large flat surfaces such as floors, doors, wall panelling, casings, etc. For mouldings and very narrow surfaces fine sandpaper is used. Whenever sandpaper is used on wood in preparation for staining, varnishing, or polishing, the finest grade will give the best results. Coarse sandpaper leaves grooves and ridges which show through the stain or other finish and mar the beauty of the grain. After sandpapering, always carefully wipe or brush off all particles of dust before staining or oiling. A sandpaper finish will no doubt be used in most cases owing to the low cost and speed in turning out work Care must be taken to use the sandpaper only in the direction of the grain.

The secret of fine finishes in stain, varnish, polish, paint, or enamel is in having absolutely dry wood and a smooth surface. All lumber for interior trim should be thoroughly kiln-dried. This is of great importance to the wood-finisher. Beautiful and permanent effects cannot be secured if the material used is not dry. Paint or varnish will not cling to moist wood. In Douglas fir and other resinous woods this fact must be emphasized, as if not perfectly dry, moisture and gum may ooze through the finish in small bubbles. Edge-grained flooring laid as it comes from the mill should always be hand-dressed, then scraped, and finally sandpapered along the grain until it is perfectly smooth before any finish is applied.

These western woods naturally lend themselves to a variety of attractive styles and colours and so can be made to harmonize with almost any kind of decoration. Experience alone teaches the best method of accentuating or softening the individual markings of each. The following methods of treatment are recommended for the finishing of British Columbia woods:—

Natural Finish.

The natural finish makes a very simple and satisfactory treatment for fir and other western woods. The wood should first be prepared to a perfectly smooth surface. Then apply a light coat of pale raw linseed-oil to which has been added a little turpentine. Allow this to penetrate the wood, and then wipe the surface thoroughly and dry for ten or twelve hours. Next apply a coat of white shellac, and when dry rub smooth with No. 0 fine steel wool. To finish, apply two coats of good-quality rubbing-varnish and rub smooth between the coats with fine steel wool. When dry rub with powdere

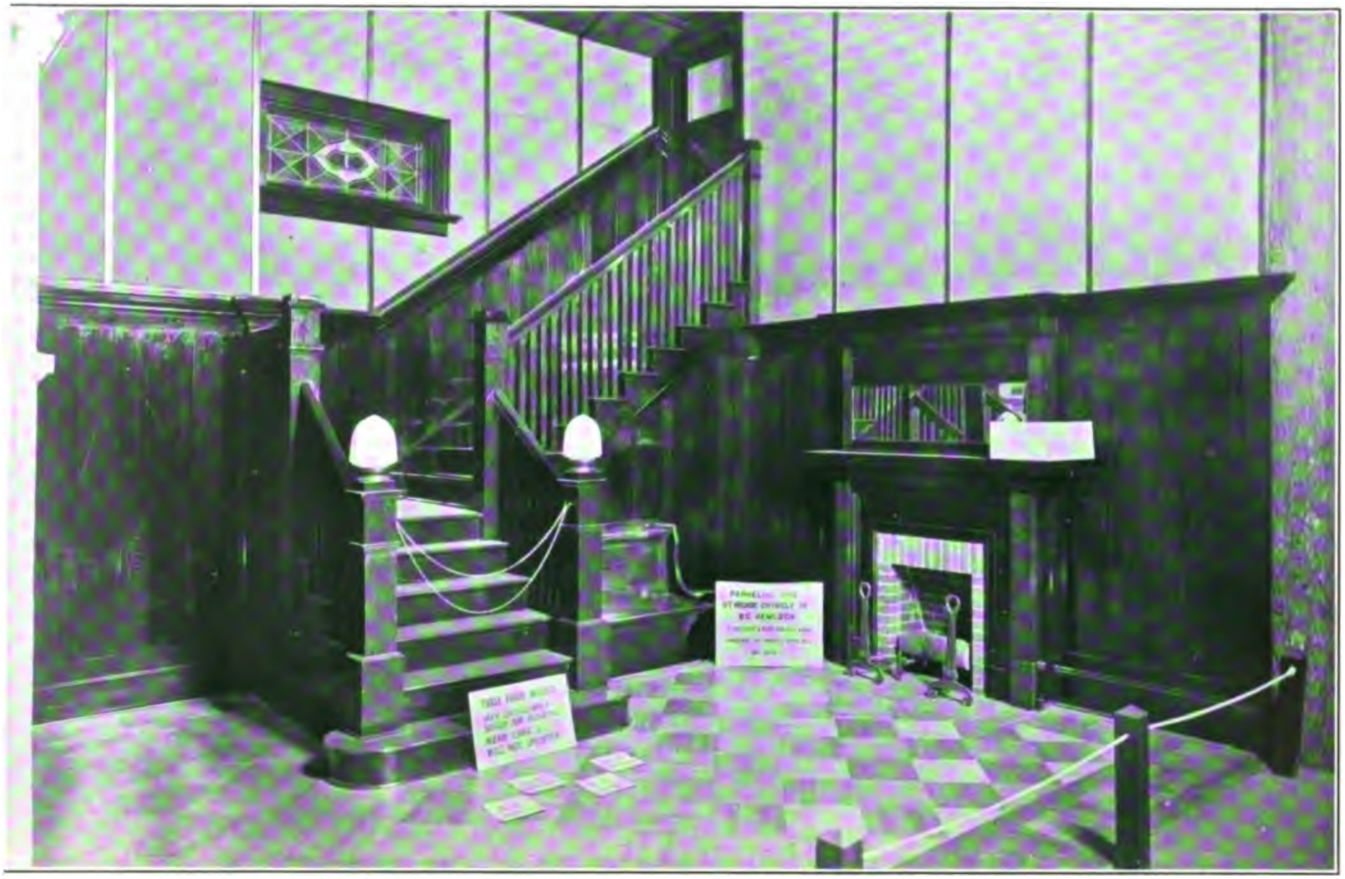


EXHIBIT OF WESTERN HEMLOCK PANELS, WOODWORK, AND FLOORING.

rotten stone and oil for a polished gloss finish, or if dull finish is desired use flat varnish for the finishing coat instead of a second coat of gloss varnish. The best results for red cedar are obtained by the following methods: Apply one coat of good clear liquid filler and finish with two or three coats of varnish. Rub down with fine steel wool between each coat, and the last coat of varnish can be polished with rotten stone and oil if desired. Particular care should be taken with cedar, as the wood is easily scratched.

Oil-stains.

Many beautiful effects can be obtained and the grain brought out more prominently on any of these woods by the use of oil-stains.

Apply one coat of penetrating oil-stain of the desired shade with a soft brush, then wipe off with a soft rag when partly set and sufficient depth of colour has been obtained. To ensure an even tone of colour it may be necessary when this coat is dry to go over the light parts and tone down to suit the darker shades. Allow this to dry for about twelve hours, and apply one coat of shellac, using white shellac in light stains. When dry rub down lightly with fine steel wool, dust off and apply the first coat of rubbing-varnish. The finish coat of rubbing or polishing varnish may be applied when the second coat is dry, and when hardened should be rubbed with curled-hair pad.

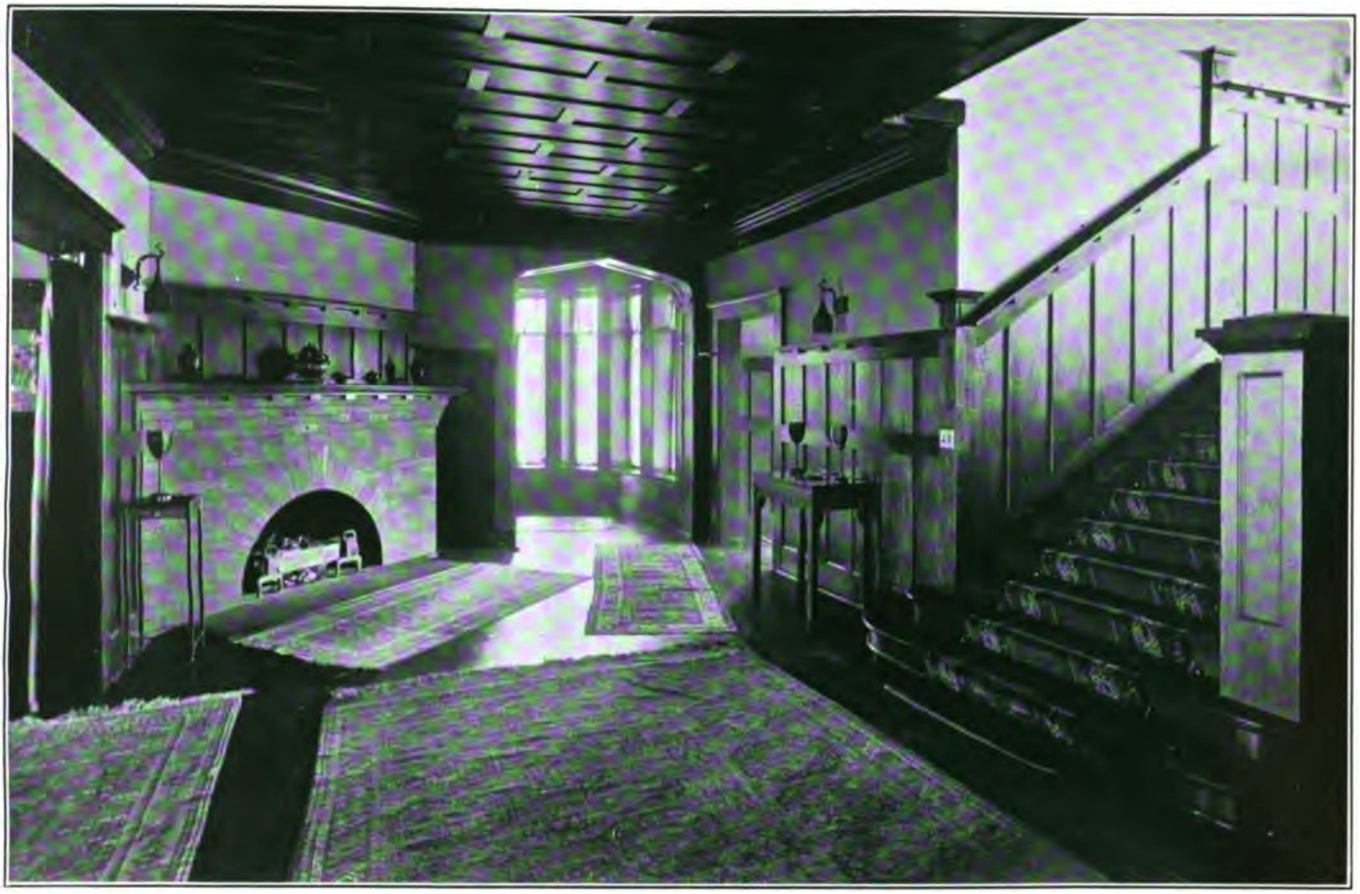
For glass finish, after forty-eight hours rub with pumice-stone, oil, and felt pad. For polished finish rub with ground pumice-stone, oil, and felt pad and polish with rotten stone and oil. All work should be finished in a dry atmosphere at a temperature of about 70° Fahr. In the use of stains a very important consideration in bringing out the grain is the prevention of overstaining. Apply the stain with a brush, and then after a few minutes wipe off with a cotton rag or cheese-cloth to bring out the tint desired. This removes the surplus stain from the hard part of the grain, brings out the distinctive markings, and prevents blurring with too much stain. Fine deep finishes are obtained, of course, by the use of extra varnish coats and a greater amount of rubbing.

Finishing Floors.

There are several methods of floor-finishing used. Two of the best are given here, both economical and very serviceable. The first is very easily applied and dries quickly.

Shellac Finish.

New floors of Douglas fir or hemlock should be dressed off with the hand-plane and well scraped. This is essential to good results. When clean apply one coat of a good paste filler. The filler should be thinned down with raw linseed-oil and benzene (mixed ratio 1 to 3) and allowed to thoroughly penetrate the pores of the wood. Any filler which remains on the surface should then be wiped off with a dry cloth and a coat of white shellac applied. The first coat of shellac should be thinned with denatured alcohol, allowing it also to easily penetrate the wood. The floor should then



BEAUTIFULLY DECORATED ALL-WOOD HALL AND STAIRCASE; DOUGLAS FIR FLOOR, WALL PANELS, AND CEILING.

be gone over with a very fine sandpaper. Finally two coats of shellac are applied, sandpapering between each. The second coat should be heavy and the last as heavy as can be worked. This process is for the very best class of work and gives a highly polished floor which will wear well. The use of a wood filler may be omitted on floors where the wear is not severe. It gives body, however, to the finish and will more than repay the cost and labour.

Varnish Finish.

A second method is as follows: On the prepared floor apply a light coat of filler, rub down with fine steel wool to remove any excess filler that remains on the surface, then apply one coat of good-quality floor-varnish and rub down with fine steel wool. To finish in gloss give two coats of best-quality varnish. If a dull finish is desired, rub down the last coat with fine pumice. For a wax finish apply one coat of prepared floor-wax instead of two coats of floor-varnish, and polish with weighted polishing-brush.

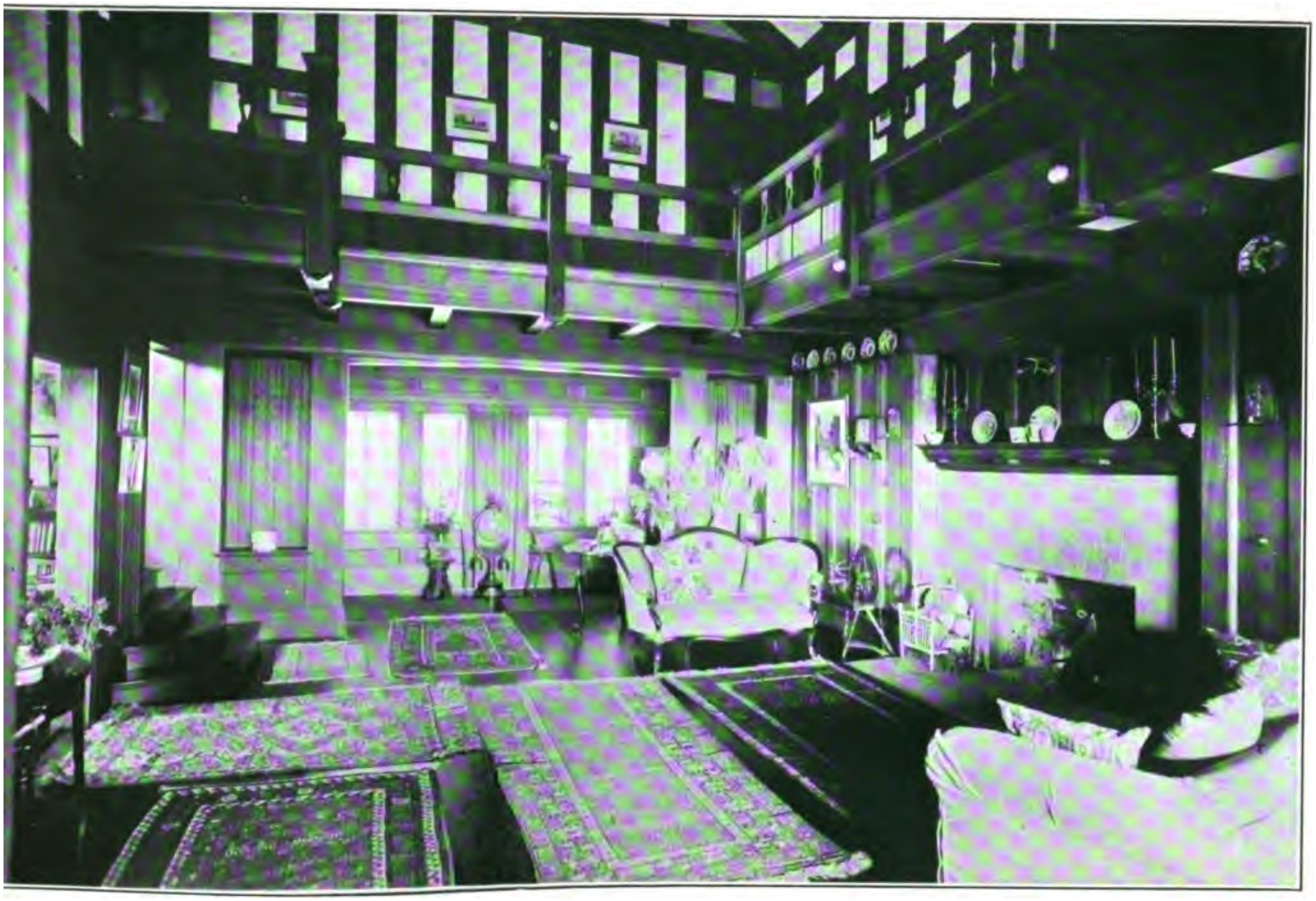
To restore the original finish to a floor when floors become dull and show wear, go over the floor with a cloth dampened with benzene, then apply a coat of floor-wax with a soft cloth. Orange shellac should not be used as a finish as it darkens the floor. The above floor finishes are, of course, in natural colours. If stain effects are desired in floors, the stain is applied first before the shellac or finish coats are put on.

Outside Finish.

To finish doors, porch panels, and outside trim which are exposed to the elements, the following method is recommended: Thoroughly prepare and smooth the surface of the wood. Then apply a heavy coat of boiled linseed-oil which contains a drying substance (any good liquid drier). Allow this to thoroughly penetrate the wood. This coat is necessary to prevent absorption of oils from the varnish. After the oil has dried sufficiently, apply two coats of outside varnish, rubbing down between each, and polish the last coat with pumice-stone and oil. If colour effects are required, the desired stain is applied first, followed by the oil and varnish.

Paint Finishes.

If a painted finish is desired, the wood should be prepared to a perfectly smooth surface as described above, except that the sandpapering may be done across the grain. Good paint-work demands at least three coats (four are better) of pure thoroughly mixed paint, rubbing down between each coat. Paint should be applied in several thin coats rather than in one or two heavy coats. For varnished or enamelled surfaces give three coats best paint, well rubbed down, and two coats of varnish or enamel. Ready-mixed paints can be obtained in abundance. A good machine-mixed paint is usually found to be cheaper, more consistent, and gives better satisfaction than does hand mixed-paint unless mixed by an expert. Care should be taken, however, to select only a first-class brand. Good paint consists of pigments such as genuine white lead, to which is added about *one-third*



LIVING-ROOM. CEDAR NATURAL FINISH; BEAM CEILING OF CEDAR; DOUGLAS FIR FLOOR.

zinc oxide, pure turpentine, and pure linseed-oil (raw for inside work and boiled for outside work), thoroughly mixed, with the addition of sufficient driers. For white-enamel work zinc white will be found better than white lead for the under-coatings.

Brief Specifications for finishing Douglas Fir and other Western Woods.

NATURAL FINISHES.

(1.) Dull finish: Two coats pure raw linseed, well rubbed.

(2.) Flat finish: One coat pure raw linseed-oil; one coat white shellac; one coat Flattine varnish.

(3.) Gloss finish: One coat pure raw linseed-oil; one coat white shellac; two coats bright hard varnish.

(4.) Wax finish: One coat pure raw linseed-oil; one coat white shellac; two coats prepared wax (beeswax and turpentine), well rubbed with soft cloth or weighted brush on floors.

STAIN FINISHES.

Substitute stain of the desired shade for linseed-oil in the above formulas for natural finish.

RUBBING.

Rub down between all shellac and varnish coats with very fine sandpaper or pumice-stone and oil. Use the best materials obtainable. A high-polish may be obtained on varnished surfaces by rubbing down with rotten stone and oil.

POLISHED SURFACES.

To give varnished surfaces a polished appearance, finish with hard bright varnish and rub down with powdered rotten stone and oil.

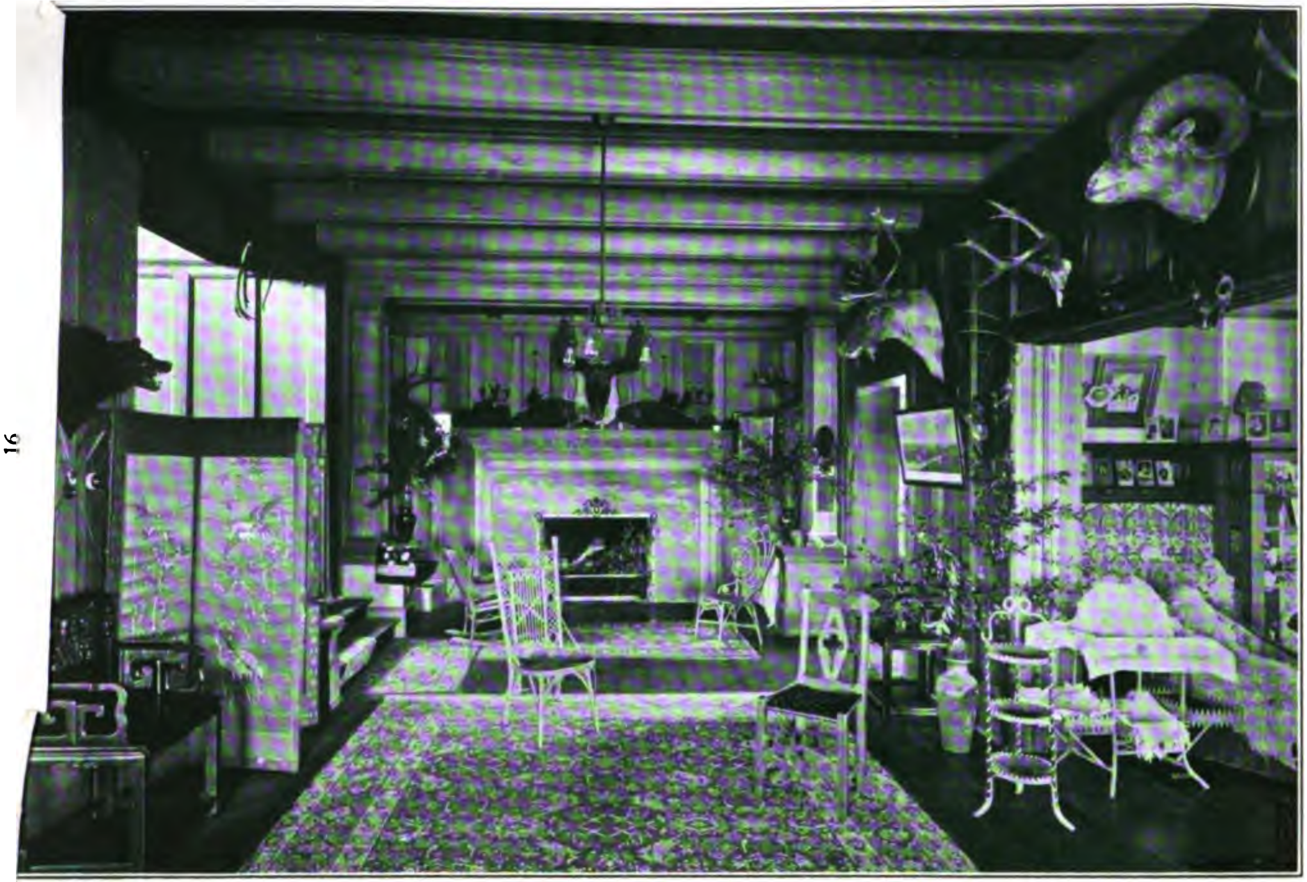
SHELLACS.

Do not use orange shellac on natural shade or light stain finishes, as the strong orange colour will destroy the tones in the wood.

Characteristics of British Columbia Woods relative to Finishings.

DOUGLAS FIR (*Pseudotsuga taxifolia*).

Douglas fir is the best known and perhaps the most important of our British Columbia woods. It is universally admired for its handsome distinctive grain and figure in panelling, doors, woodwork, and floors. When properly finished it rivals many of the hardwoods, as witnessed by its appearance in certain of the most attractively decorated halls and salons in private and public buildings on this continent. Its hardness, susceptibility to stain, and ease of working, combined with a durability and strength which have ade it famous for structural purposes, are qualifications found in no other od that can be obtained at such a price. With age, Douglas fir hardens, hen polished presents a handsome, mar-resisting surface, rivalling that



INTERIOR FINISH. A BEAM CEILING OF CEDAR. ROOM IN VICTORIA RESIDENCE.

WESTERN HEMLOCK (*Tsuga heterophylla*).

Western hemlock, unlike the eastern species, is a hard straight-grained wood and has a distinctive grain of unusual beauty for posts, railings, mouldings, panelling, and doors. As a flooring it is equal to Douglas fir. It is very easy to work and takes a polish extremely well. It is wholly free from pitch, a very desirable quality for " finish " woods.

WESTERN RED CEDAR (*Thuja plicata*).

Western red cedar has been used as a finishing wood for many years. Its beautiful grain and colour has always been attractive and its great durability has given it an ever-increasing demand. The oil contained by this wood gives off a pleasing aroma which is said to be distasteful to moths. This attribute has increased the use of this wood for the building of clothes-chests, etc. It is used for columns, posts, all kinds of mouldings, doors, sash—in fact, nearly every kind of interior finish. It is very easy to work and takes finish or stain well. Cedar panelling in plain oil finish mellows down with age to a restful pleasing effect of refinement and taste for library or den.

SPRUCE (*Picea sitchensis*).

Sitka spruce is a very light-coloured wood and the grain is most attractive. It polishes and stains well. The wood is very light in weight and strong, and is suitable for doors, sashes, mouldings, and as sounding-boards in musical instruments. It should not be used, however, where it is subject to constant rough wear, where other woods might give better satisfaction.

MOUNTAIN WESTERN PINE (*Pinus ponderosa*).

Mountain western pine offers a fine smooth surface and a very attractive grain. It takes and retains polish well and offers a good surface to hard wear. It is manufactured into all kinds of finish and is particularly adapted to sash and door and other outside and inside trim. Select mountain western pine is very similar to eastern white pine, and has frequently been used as such as far east as the New England States.

WESTERN LARCH (TAMARACK) (*Larix occidentalis*).

Slashed or quarter-cut western larch has a beautiful feathery grain, highly desirable as finish material. It takes a high polish and presents a hard smooth surface, very attractive in mouldings, and serviceable as an edge-grain flooring.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1915.

NORTH DAKOTA AGRICULTURAL COLLEGE

Government Agricultural

Experiment Station

OF

NORTH DAKOTA

Bulletin No. 70

PAINTS AND THEIR COMPOSITIONS

By E. F. LADD and C. D. HOLLEY

Any farmer, teacher or student in the State may have this Bulletin mailed to his address, free of charge, upon application

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FARGO, NORTH DAKOTA, U. S. A.
June, 1906

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PAINTS AND THEIR COMPOSITION.

By E. F. Ladd and C. D. Holley.

Inasmuch as only a few of the brands of paint offered for sale in the state were reported upon in Bulletin No. 67 and this fact led to some misunderstanding on the part of the consuming public it seemed desirable, after the Court decision, declaring the state paint law constitutional, to further investigate the subject of paints and to examine as far as possible all brands known to be on sale in the state or which, from time to time, are being shipped into the state thus bringing the entire information before the consumers who are constantly writing in order to know with regard to the composition of the various paints not previously reported upon.

Under the date of February 26, 1906, there was issued by this department the following circular notice:

The North Dakota paint law has been declared constitutional and valid. The decision was rendered February 24, by Judge Amidon of the United States district court. The paint law is, therefore, now in force and it is expected that the manufacturers and jobbers who ship paints into the state from this time on will comply with the requirements of the same and label the products where such labels are found necessary.

We ask the manufacturers and jobbers who now have paint in the state to take steps to have the same properly labelled and in order to tide over the present conditions we allow, for such paints, an exemption until April 1, 1906, so that suitable labels may be prepared and furnished to the dealers. This department stands ready and willing to give every assistance possible to those who are interested and desire our aid. A label in form like the following will, by this department, be deemed as complying with the spirit of the law:

	Per cent.
White lead	18
Zinc oxide	35
Barytes	25
Calcium carbonate	22

Together with the necessary coloring matter to produce the desired tint.

It is assumed, of course, in the above that the coloring matter, when so labelled, is a product which is commercially pure. The liquid portion should also be labelled where necessary in order to show the proper ingredients. Water, when present in quantities not to exceed 1.5 per cent, may be considered as incidental. Where western zincs are used that do not carry more than 5 per cent of lead sulphate, the same may be properly considered as commercial zinc oxide or the term "western zinc" might be employed. The terms "leaded zinc" and "sublimed white lead" will be deemed as sufficient designation of these ingredients on the label.

Feb. 26.

(Signed) E. F. Ladd, Commissioner.

PAINT LAW TO BE ENFORCED.

I am glad to be able to say that the majority of paint manufacturers, especially those who do a large business in the state, have expressed their willingness to comply with the requirements of the law, as interpreted in the paint circular and have so prepared their labels. Naturally, there would be some confusion in the placing of labels on the stock in the state but in general this matter has been well handled by the manufacturers and there is little to be complained of in this direction.

It is believed that of each of the brands of paints generally sold in this state at least two shades have already been analyzed and the results are given in the following pages. In most instances there is reported upon an outside white and one of the grays although it is impossible to always secure the same shade from the different brands. As far as possible a pearl or silver gray, or lead color has been selected for examination. This investigation has necessitated a large amount of analytical work but in every instance the work has been carefully checked up in order that no injustice should be done any manufacturer and a report of the results of our analyses as soon as completed have been forwarded to the producer where their address was given upon the can. In but two or three instances have there been complaints of the accuracy of our results and check analyses have confirmed our findings, and at times led us to believe that the product as purchased on the market from the stock in hand did not represent the product as now being produced by the company. In other words the manufacturer has changed his formula since the law was enacted.

PAINT LAW.

It is held by this department that every mixed paint of whatever description, white leads, paste paints, floor paints, carriage paints, barn paints, etc., to be offered for sale in the state must conform to the requirements of the state law. It is true that the law as enacted by the last session of the legislature is somewhat ambiguous but the department has tried to interpret it liberally and in the spirit of fairness to the consuming public and producer. Of course, it is not always easy to determine just what the spirit of the law would be in a particular case without knowing more definitely the range of composition for the various products which enter into the manufacture of paints. It is believed that Section 1, of the paint law might properly be divided under four heads and that there should be introduced a section more fully defining paints.

WATER IN PAINTS.

We emphasized strongly in Bulletin No. 67 the evils of the presence of a large amount of water in paints and showed that some of the paints upon the market in the liquid portion contained as high as 24 per cent. It is not our purpose to repeat what was said at that time but refer the reader to the original. We may, however, in passing state that paint materials, linseed oil, various pigments and other products that enter into the composition of paint must naturally carry a small amount of hygroscopic moisture. We have, therefore, held that paints which contain not to exceed 1.5 per cent of water in the fluid portion are to be considered as pure in this respect, and that such water is to be classed simply incidental to the process of manufacture. I do not mean by this that the paint might not have been produced without any water or that the presence of the water has added anything of value to the paint. This feature we are not now considering. In our late bulletin some paints were reported to contain from 0.1 to 0.5 per cent of water in the liquid portion. Now, this water was not to be considered as having been employed by the manufacturer but water naturally present in the pigment and fluid menstrum from which the paint was produced. In making a complete analysis all these constituents must be taken into consideration in determining its composition. Paints, therefore which contain a small fraction of a per cent as indicated above are not to be considered as having had water added to them. I feel called upon to make this statement since certain representatives, of paint manufacturers, have misrepresented and distorted the facts, as given by this department, and in many instances this has been done willfully, and to the disgrace of the house lowering itself either directly or through the agency of its employes to such a policy.

Paints containing water may be divided into two groups: those which contain less than four per cent., and those which contain nine or more per cent. It is significant that the paints should divide so sharply in per cent. of moisture present, and it would indicate clearly that those containing a large per cent. have the added water for the purpose of cheapening the cost of production, whatever may be said with regard to the use of the small amount of water in some mixed paints.

In the following table I have compiled the data showing those paints which contain a high per cent. of moisture, and it will be noted that the O. L. Chase paint number 170, is repeated twice, giving in the first place the per cent. of moisture in the paint when oil has been mixed with it ready for use, and again, giving the per cent. of moisture as it occurred in the original package without the addition of the oil, and just as it was received from the manufacturer:

St. No.	Brands Containing High Per Cent. of Water.		Per cent. Water.
170	O. L. Chase, Mixed Paint	Tint	7.4
66	Tower Brand Mixed Paint	White	9.1
175	Ajax Brand Mixed Paint	White	9.3
123	Town and Country Mixed Paint	White	10.0
88	N. B. & C. St. Paul Paint	White	10.3
185	Tower Brand Mixed Paint	Tint	11.3
167	"Made for You" Paint	Tint	11.8
184	Star Brand Mixed Paint	Tint	13.7
150	Gold Medal Paint, Woolworth & Co.	Tint	13.9
183	Seroco Brand Mixed Paint	Tint	14.5
169	Champion Mixed Paint	Tint	15.0
173	Pitkin's Premium Paint	Tint	15.7
154	Diamond Brand Mixed Paint	White	16.1
155	Diamond Brand Mixed Paint	Tint	16.7
55	Noxall Brand Mixed Paint	White	17.0
153	Detroit W. L. Co's. Liquid Paint	Tint	17.2
67	Star Brand Mixed Paint	White	18.0
159	Champion Mixed Paint	White	18.4
114	Town and Country Mixed Paint	Tint	18.6
158	Golden Rule Cottage Colors	Tint	20.5
170	O. L. Chase Mixed Paint	Tint	20.9
56	Perfecto Mixed Paint	White	22.0
174	Gold Medal Paints Morrison Pt. Co.	Tint	22.5
48	Seroco Brand Mixed Paint	White	24.0

RELATION OF VEHICLE TO PIGMENT.

One may fairly ask what should be the relation of the fluid portion to the pigment in paints. To answer such a question, which has frequently been put to us by the people of North Dakota, one should have a complete knowledge of the composition of the various paints and shades as found on the market. Then it is probably true that the relation would be found to vary somewhat according to the shades employed. The white shades contain a larger proportion of pigments to the menstrum than do the darker shades but from such data as we have gathered from the paints thus far examined it may be said that as a rule in the better paints, the fluid portion of the paint, ranges from 35 to 40 per cent of the total weight thus leaving from 60 to 65 per cent for the pigment. Where paint is sold for $1.60 per gallon when linseed oil can be had for $.40 per gallon there is more profit in introducing a larger proportion of oil than of white lead and one might in this way cheapen somewhat the cost of production by thinning the paint to an undesirable extent.

WHITE LEADS.

A number of commercial brands of white lead, found in the state, have been examined and outside of the recognized makers of white leads not one has been found which did not contain a large amount of inert matter and in some instances they have been found to contain no white lead whatever. In this connection I would especially call attention to Wier's (Improved) Bavarian White Lead, the American Pure white lead, Globe white lead, Michigan Seal white lead, Columbian white lead and United States white lead together with a number of others not labelled as to the name of the manufacturer but reported upon in this bulletin. We may take for example Bavarian white lead made by D. T. Wier White Lead Co., of St. Louis, the composition of which is indicated by the following:

	Per cent.
White Lead	00.00
Lead sulphate	5.07
Zinc oxide	25.00
Barytes	69.70
Undetermined Matter	0.23
	100.00

The D. T. Wier White Lead Co., in a letter under date of March 17th which bears the signature of the president of the company state as follows:

"We will say in answer to your favor of the 15th, that since the North Dakota paint law went into effect, we have withdrawn from the state and do not propose to sell any goods in North Dakota so long as that law is operative. Therefore, we have no labels and will not have any labels that are adapted to the wants of North Dakota."

They further say in the same letter, "While writing on the subject, we cannot see that the law in question has benefitted anyone except two trusts who control two pigments specified in the law. We have been about a quarter of a century perfecting our method of grinding and our formula and we do not propose to advertise that to the general public as required by the law of your state."

The analysis above would indicate the wisdom of the firms' decision.

The reader is referred to similar statements with regard to the composition of other white leads reported upon in this bulletin and it would seem that there can be no good reason for classing this product as white lead, in fact, their further sale in the state under the label of white lead will make it necessary for this department to begin prosecution against parties who may be handling this class of paints.

ABUSES BY MANUFACTURERS AND THEIR AGENTS.

Since the publication of Bulletin No. 67 and the enforcement of the paint law there has sprung up, on the part of certain manufacturers and their agents, abuses which can in the future reflect no credit upon those who have taken part in promoting these abuses. The analyses as set forth in Bulletin No. 67 have been used by representatives of certain houses in a way that is entirely unjustifiable. The course pursued in some instances has been such as to make it necessary for this department to take notice of the fact and to demand that a change in policy be made at once on the part of the houses or agents under consideration. While doing everything possible to cover up the short-comings of their own paints, they have distorted the facts with regard to that of their competitors when it would have been far better for them had they attended to their own business and emphasized the good qualities, if there were any, in their own paint and left that of their competitors alone.

A house which either through its own representatives or agents resorts to a course of this kind is not above suspicion. Again, when a house informs its agents that it is their business to sell paints and not to know the composition of the same, that the composition of the paint is the particular business of the factory to look after it cannot be expected that these representatives will do other than claim their paints as containing the constituents which the public have been led to believe, and, often by the representations of these same houses, to be the true basis for all the best grades of paint. This policy is and has been pursued by some houses and at the present it is tending to wreck the reputation of the paints which they have been handling. Worse than all this is when a house prints deliberately upon its labels that this product is composed of pure white lead and zinc oxide and the paint is found to contain not a trace of white lead. What is to be said of the business policy of such firms? Have the public not a right to be suspicious of anything which they may handle or of the business methods of such a concern?

SHORT MEASURE.

Not only is there a wide variation in the composition of paints but the paints of certain houses are frequently short in measure, sometimes to the extent of 10 to 13 per cent. Thus, a man paying for a two quart can of some of the mixed paints may receive but 1.75 quarts thus loosing 12½ per cent which gives a very considerable profit to the benefit of the manufacturer of this paint as compared with the manufacturer who gives full measure. We have, therefore, in the following pages tried to give the true measure of each and every sample of paint which has been examined by this department. It is believed that this publicity will have a tendency to force all manufacturers to bring the standard of measure more nearly to what it should be.

SHORT WEIGHTS OF WHITE LEADS.

All the white leads and so-called white leads, examined by this department, have been found to be short weight. That is, the kegs supposed to contain 12½ pounds will actually contain in each eight kegs which should have shown 100 pounds only 83 to 89 pounds. As showing to what extent the different so-called white leads actually varied and fell short in weight I give the following list.

	Assumed weight lbs.	Net weight lbs.	oz.
Michigan Seal	50	46	0
Crown White Lead	12½	11	13
Railway White Lead	12½	10	6
Red Seal	12½	10	7
Red Seal	25	21	12
Michigan Seal	25	22	7
*Columbia White Lead	12½	10	0
United States	12½	11	0

From an inspection of the above table it will be observed that none of these products contain an amount which the purchaser assumes to be present. It is true that for a number of years this condition has prevailed but in making corrections of evils now existing it seems a good time to place this product on a basis of the true net weight. Why should a man pay for 12½ pounds when he receives but 10½? It is claimed that this additional price pays for the pail or keg but the man who is calculating on the amount of material is misled and has a right to expect that the product shall be labelled truthfully not only with regard to the actual composition, but to the weight as well. While the paint law does not apply to weights under the general law of the state it is believed there is sufficient ground for demanding that this change be made on the part of those who would send their products into North Dakota.

RELATION OF LEAD TO ZINC.

The question is generally being asked what should be the relation of the lead to the zinc in the pigment of our mixed paints. An inspection of the analyses of the various paints will show that the per cent of lead varies from nothing to about 60, while the proportion of zinc in the mixed paints ranges from 20 to 80 per cent. The practical paint

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*There has been some considerable leakage of oil from the package.

men seem to differ with regard to the proportion of lead to zinc in mixed paints but some of the best of these from whom we have gathered information would indicate that for outside house paints, not less than two-thirds of the pigment should be in the form of lead. This would leave one-third zinc. It would seem where inert material is substituted as though the proportion should not exceed that which is employed in the form of zinc or one-third of the total. It is true, however, that there are but few paints on the market which contain more than 50 per cent of white lead. Just what the best proportion is can only be determined by actual experiments and investigation.

To what extent the leading manufacturers have been influenced by actual experiments in determining the proportions of lead to zinc or, to what extent the desire to cheapen the cost of the product has been a factor in determining the relation of lead to zinc in paints, is hard to determine. Again, the fact that the manufacturers have been forced to meet competition with cheap and spurious products may have made it necessary that they produce a product not as good as they knew how to, but as good as the public will pay for. Already there is a marked improvement and the proportion of white lead has been much increased in several well-known brands. This would certainly seem to indicate that paint manufacturers recognize the superior value of white lead as the basis of paints.

In looking over the analyses as given in the following pages, one is surprised to note the number of paints that contain inert material in excess of 10 or 15 per cent. Certain manufacturers have maintained that the presence of a small amount of inert material, carbonate of lime, etc., was desirable for the purpose of neutralizing any acid in the oil or other paint ingredients thus insuring better protection to the paint and preventing the deterioration of the oil. None have, however, maintained that the quantity need exceed, for this purpose, 5 per cent and many have indicated that not more than one or two per cent need be employed. It has also been maintained that the presence of a small amount of inert material prevented the settling of the pigment in the can and the consequent solidifying which sometimes take place. None, however, have maintained tha more than 10 per cent was necessary for this purpose. Certainly, it cannot be said that from 30 to 70 per cent are essential, therefore the substitution of a larger amount tha 10 per cent must be either because it produces a paint equa to or superior to white lead and zinc as indicated above o else it is used as a cheapening agent. It is not our purpo to discuss the relative merits of these several paint constit ents at this time but it is a matter of more than passin interest to know which of the paints contain more than 1 per cent of such inert material as chalk, barytes, silica, et I have, therefore, arranged in order of per cent in the fo lowing table all those where the amount is in excess of 1 per cent.

BRANDS OF PAINT HAVING 15 PER CENT. AND OVER OF INERT MATERIAL.

Station Number		Per cent
151	N. B. & C., St. Paul Paint	16.4
66	Tower brand Montgomery Ward & Co	19.1
152	B. P. S. Patterson & Sargent	20.0
166	Armstrong's Mixed Paint	20.1
175	Ajax Mixed Paint	20.6
165	Armstong's Mixed paint O. W.	20.9
177	Parian Brand Farwell, Ozum, Kirk	21.1
153	Detroit W. L. W'ks Liquid paint	21.2
185	Tower Brand Mixed Paint	25.3
105	Lucas & Co.'s Gloss Paint	25.7
108	Best Prepared Pt. Heath & Milligan	26.0
173	G. W. Pitkin's Premium Brand	26.1
169	Champion, Detroit W. L. Works stone color	27.3
160	Best Prepared Pt. Heath & Milligan French gray	29.6
60	Lion Brand St. Paul W. L. & Oil Co	29.9
59	Green Seal	31.1
142	Breinig's Lithogen Silicate Paint	33.2
57	Favorite House Pt. Masury & Son	34.5
56	Perfecto, Enterprise Pt. Co	37.6
67	Star brand U. S. Pt. Co	41.1
55	Noxall, Enterprise Pt. Co	42.9
159	Champion Detroit W. L. W'ks. O. W.	44.7
150	F. W. Woolworth's Gold Medal	46.3
49	Ruchter's Durable paint	46.9
174	Gold Medal Morrison Pt. Co	47.3
183	Seroco Mixed Paint	47.8
184	Star Brand	48.6
48	Seroco Paint Co	49.9
158	Golden Rule Cottage Colors	49.1
9	Peoples' Paint	53.3
170	O. L. Chase	55.2
154	T. M. Roberts' Diamond brand O. W.	68.2
155	T. M. Roberts' Diamond brand gray	69.4
167	Parker Perfect Pt. Co	70.6

COST OF PAINTS.

Some of the paints furnished by catalog houses, and others who do business of a similar nature, cost to produce less than one-half that for good paints even though the good paint contains a considerable percentage of inert material, that is, the pigment in one of these catalog house paints per gallon has been estimated to cost 12½ cents while in another paint the pigment in each gallon would cost not less than 57 cents on the same basis of estimation. There are other cheap paints costing less to produce even than the one indicated above and, too, in the liquid portion there is even a wider variation in the cost of the two classes of paints.

Water and benzene are not to be classed in cost with good turpentine and linseed oil. Neither are they to be considered as adding anything of virtue to the paint. Three pounds of sal soda, one and one-half pounds glue, one and one-half pounds of borax and two pounds of sugar of lead in 50 gallons of water when mechanically combined with the pigment to the extent of 12 to 24 per cent of the fluid of the paint might make a good profit for the manufacturer and furnish a "dope" deceptive to the consumer but nevertheless it is a shameful fraud. It would not be strange, however, if this did not fairly represent some of the "jelly-in-the-pail" like paints.

OCHRE AND PRIMING.

Many cheap ochres are employed as tinting agents in certain paints. It is a question whether the presence of such ochres, when found in paint, is not to be classed as a cheapening agent rather than a true coloring matter of commercial purity. The introduction of from 10 to 20 per cent of ochre into a paint which is one-half calcium carbonate or other foreign constituents can, in my judgement, only be looked upon as a cheapening agent, especially when, after the addition of this amount of tinting matter, it still becomes necessary to re-enforce the color with a more concentrated tinting product, as is true in some paints which we have examined. What constitutes a commercially pure ochre is a difficult problem to determine, in the present state of our knowledge. It seems necessary that we make an examination of ochres in order to determine their composition and range of variability.

The fact that some one may choose to put upon the market a product, which is sold under the name of ochre, does not of necessity make the product what is claimed for it. Similar statements may be made with regard to the composition of various other products which are used in the preparation of paints. To call a product silica, is to assume that it is possessed of a definite composition but when this product is found to be made up of a larger proportion of foreign constituents than of true silicates it seems that the same end had been accomplished as had been sought by those who have introduced calcium carbonate or other cheapening agents or inert constituents in the place of white lead or zinc oxide.

Of one thing, however, we feel confident and that is that the average American ochre, as employed in paint manufacture at the present time and especially for the purpose of priming, cannot be too strongly condemned. It has not the virtue that has been claimed for it. In the judgment of the writer, ochre as now furnished should never be used on a good building as a priming coat. The purest white lead and the best linseed oil , or, in lieu of these, the highest grade of mixed paint well thinned down had far better be employed in priming a house than to use ochre.

In a recent issue of the Painters Magazine, in discussing ochre, the following statement is made which is of interest at this time.

"Yellow ochre which is, to use a common phrase, simply yellow clay colored by hydrated ferric oxide. French ochre to pass inspection by the various service department scientists of the U. S. Government must be of good bright color, contain at least 20 per cent. sesquoxide of iron and not over 5 per cent. of lime in any form."

SIZE OF CAN.

The size of the can does not vary greatly for the leading manufacturers of standard paints. There is, however, a noticeable difference in the size of the cans used by the leading catalogue houses doing business in the State. Not only are these paints as a rule notoriously cheap and inferior products, but one does not secure full measure as shown by the following:

		Size of Can. Quarts.	Contents. Quarts.
185	Montgomery Ward & Company,......	1.91	1.82
184	Montgomery Ward & Co(U. S. Pt.CO.)	1.94	1.76
183	Sears, Roebuck Co. (Seroco)........	1.95	1.70
154	T. M. Roberts Company,............	1.95	1.75
155	T. M. Roberts Company,............	1.95	1.92
170-1	Chase, ...	3.90	3.41

It will be observed in the column headed "contents" above that there is a very material shortage and, in the case of Chase, the paint as purchased instead of getting the full gallon one actually receives 3.41 quarts. Here is certainly a good margin of profit for the paint producer, without taking into consideration the character of the product which enters into the can.

VOLATILE OILS.

One cannot study the analysis in the following pages without having his attention called to the wide variation of the amount of volatile oil and driers which are used in the several paints. It is noticeable that in many of the paints where the best driers are used, from 4 to 7 per cent. seems to meet the wants of the manufacturer in the paints they send out.

A prominent paint chemist commenting upon the composition of certain paints stated as follows: "Both paints con tain an excess of weak drier, four per cent. of strong drier being sufficient for a heavy bodied paint."

Some of the paints reported upon in the following pages show from 15 to as high as 30 per cent. of the liquid portion in the form of drier or volatile oils, and usually it is found that this is a very cheap product made up largely of benzine and, probably in some instances, of rosin driers.

STATUTORY PAINTS.

The question is frequently asked by our correspondents as to which paints comply with the North Dakota law so as not to require labelling. This is not always an easy matter to answer, or at least until all of the shades have been analyzed. In fact, there is probably no manufacturer who will not find it necessary to label with regard to composition some of the dark shades usually made upon other than a lead base.

Of the paints which we have found on sale in North Dakota during the past three months and not requiring to be labelled as to composition or, in other words, made from the statutory pigments, lead and zinc with pure tinting colors, the following brands may be mentioned with the per cent. of white lead, the capacity of the can, and the weight per gallon:

Station No.	Brand.	Per cent of White Lead	Quarts in Can	Weight Per Gal. Lbs. Oz.
135	Minnesota O. P. Co.	50	1.01	16- 3
86	Blood's Paint	30	0.98	15- 8
172	Monarch	40	0.96	13-12
149	Horseshoe	40	0.94	15- 8
112	Gilt Edge (New)	50	1.03	16- 0
125	Atlas Paint (New)	40	1.06	14-12
176	Lion (New)	50	1.01	16- 8
147	Devoe's	30	0.95	13-10

A few other paints may possibly be added to the above list not, as yet, on sale in the State, since their formulas have been changed.

In the above list the Atlas, Gilt Edge, and Lion Brands are being made under a new formula to comply with the requirements of the North Dakota Law.

Under the new formula adopted for the Monarch paint it may be expected that this paint will then take the second place, following the Minnesota. It is undoubtedly true that several other paints, now that there is afforded them some protection and a demand has developed, for a lead and zinc paint with pure linseed oil and turpentine dryers, will find their way into the State and displace some of the cheap and inferior products handled by catalogue houses, department stores, and advertising concerns.

COST OF PAINT PIGMENTS.

The cost of the various pigments used is a question of great importance with the paint manufacturer, and the following table of quotations prepared from recent paint journals will be of interest:

Name of Pigment.	Price per 100 lbs.	
White Lead	$6.38	$6.50
Sublimed White Lead		7.00
Zinc Oxide	4.50	5.00
Zinc Lead White		4.25
Lithopone	3.75	7.00
Barytes	.65	1.25
Whiting (Calcium Carbonate)	.43	.50
Paris White, Eng. Cliffstone (Calc. Carb.)	.75	1.00
Magnesium Silicate	.75	1.50
Silex, Silica	.60	2.00

TRADE NAMES FOR SOME OF THE PRINCIPAL PAINT PIGMENTS WITH CHEMICAL NAMES.

Trade Names.	Chemical Names.
Barytes	Barium sulphate
Blanc Fixe	Precipitated barium sulphate
Corroded Lead	Basic lead carbonate
English white	Calcium carbonate
Gypsum	Calcium sulphate hydrated
Lithopone	A combination of barytes, zinc oxide and zinc sulphide in various proportions.
Marble dust	Calcium carbonate
Ochres	Silicate of Alumina colored with ferric oxide
Paris white	Calcium carbonate
Ponolith	Similar to Lithopone
Princess Mineral	Oxide of iron
Silex	Silica
Silicate of Magnesia	Magnesium silicate, a natural earth product.
Silver White	Silica
Spanish White	Calcium carbonate
Sublimed White Lead	Apparently a basic lead sulphate carrying a small portion of zinc oxide.
Terra Alba	Calcium sulphate
Tuscan Red	Oxide of iron
White Lead	Basic carbonate of lead
Whiting	Calcium carbonate
Zinc Lead White	Composed of about equal parts lead sulphate and zinc oxide.
Zinc White	Zinc oxide
Zinc Oxide	Zinc oxide
Zinc Oxide (leaded)	Zinc oxide containing a varying amount of lead sulphate.

ANALYSIS OF WHITE LEADS.

Station No. 143. Michigan Seal White Lead.

Acme White Lead & Color Works, Detroit, Mich.

"Acme Quality."

Guarantee. "We guarantee our Michigan Seal Brand of White Lead to be superior to any white lead in the market as regards opacity or body covering capacity. It is also extremely durable, possessing in this important particular great merit. For whiteness and fineness of texture it will be found unsurpassed."

Assumed size of steel keg	25 ℔

Gross weight	25 ℔ 8 oz
Net weight	22 ℔ 7 oz
Shortage on basis of 100 ℔ is	10 ℔ 4 oz

Analysis of pigment.	Per cent.
White lead	37.51
Lead sulphate	7.84
Zinc oxide	25.87
Calcium carbonate	20.36
Barytes, Silica and undetermined	8.42
Total	100.00

Station No. 162. Michigan Seal White Lead.

Assumed size of steel keg	50 ℔
Gross weight	51 ℔
Net weight	46 ℔
Shortage on basis of 100 ℔ is	8 ℔

This product is, like all the white leads so called, short in weight. It is not a white lead but a mixture of various paint ingredients and therefore falsely labelled.

Station No. 163. Crown White Lead.

Bradley & Vrooman Co., Chicago.

"We conform to the laws of the state of North Dakota by stating that Crown White Lead is made as follows:

Lead (sulphate)	60 per cent.
Zinc (oxide)	40 per cent.
Total	100 per cent.

Assumed size of keg .... 12½ lbs.

Gross weight	13 lbs. 12 oz.
Net weight	11 lbs. 13 oz.

Analysis of Pigment	Per cent.
Sublimed lead	61.19
Zinc oxide	38.81
	100.00

This product is not white lead but is made from sublimed lead and zinc oxide. The producers have informed us that the paint is to be sold under the label of "Crown White" to which there can be no objections when labelled to show its composition.

Station No. 37. White Lead, Diamond Brand.

Carter White Lead Co., Chicago.

"Guaranteed Strictly Pure White Lead. This package contains 92 per cent carbonate of lead, 8 per cent linseed oil. The Carter White Lead Co. will pay $100 and the cost of analysis for the detection of any adulteration in this or any other package bearing this brand."

Stated weight	2 lbs.
Net weight	1 lb. 15.5 oz.

Shortage 1.5 per cent

Analysis of Pigment.	Per cent.
White lead	99.28
Undetermined	0.72
	100.00

Station No. 126. White Lead, United States Brand.
Enterprise Paint Mfg. Co., Chicago.

"United States White Lead is good white lead."

Assumed size of keg	12½lbs
Net weight	11 lbs.
Shortage on the basis of 100 lbs. is	12 lbs.

Analysis of Pigment.	Per cent.
White lead	00.00
Lead sulphate	19.30
Zinc oxide	20.03
Calcium carbonate	7.98
Barytes	52.48
Undetermined	0.21
	100.00

This product is 12 per cent short in weight, the label reads "United States White Lead is good white lead." But the United States White Lead contains no white lead whatever, to call it white lead is, to say the least, a misnomer. It can not legally be called white lead, and it must bear a label showing its composition.

Station No. 164. Railway White Lead.

Heath & Milligan Mfg. Co., Chicago.

"Whitest. Most Opaque, Most Durable."

Assumed size of keg	12½ lbs.
Gross weight	12 lbs. 10 oz.

Net weight	10 lbs. 6 oz.
Analysis of Pigment.	Per cent.
White lead	38.95
Lead sulphate	4.81
Zinc oxide	33.58
Calcium carbonate	19.48
Barytes & Silica	3.18
Total	100.00

While this might be called "Railway White" it cannot be said to be white lead. It is short weight and 60 per cent other than white lead.

Station No. 141. Columbia White Lead.

Iowa Paint Mfg. Co., Fort Dodge, Iowa.

"In Pure Linseed Oil."

Assumed size of keg	12½ lbs.
*Net weight	10 lbs.
Analysis of Pigment.	Per cent.
White lead	55.03
Lead sulphate	00.00
Zinc oxide	15.21
Barytes and silica	29.33
Undetermined	0.43
Total	100.00

This paint like the other whites is short weight and contains 45 per cent of adulterants.

Station No. 182. Longwear Tinted Lead. White.

Longwear Tinted Lead Co., St. Louis Mo.

Analysis of Pigment.

Pigment.	Per cent.
White Lead	00.00

*Considerable oil had escaped from package.

Lead Sulphate	8.32
Zinc Oxide	42.05
*Barytes	41.43
Calcium carbonate	8.04
Undetermined	0.16
	100.00

The above product can in no way lay claim to being a white lead. It is falsely labelled and wholly adulterants.

Station No. 110. White Lead, Red Star Brand.

Senour Mfg. Co., Chicago.

Analysis of Pigment.	Per cent.
White lead	97.72
Lead sulphate	2.00
Undetermined	.28
Total	100.00

Station No. 156. Red Seal Brand White Lead

St. Louis Lead & Oil Co., St. Louis, Mo.

"Strictly Pure White Lead"

"The contents of this package is composed of 8 per cent of linseed oil, 92 per cent carbonate of lead. The St. Louis Lead and Oil Company will pay $100 and the cost of analysis for the detection of any adulteration in this or any package bearing their brand of strictly Pure Lead."

Assumed size of keg	12½ lbs.
Gross weight	12 lbs. 8½ oz.
Net weight	10 lbs. 7 oz.
Shortage on basis of 100 lbs. is	16½ lbs.

Station No. 157. Red Seal Brand White Lead.

Assumed size of keg	25 lbs.
Gross weight	25 lbs. 1 oz.

*Includes a very small percentage of natural silica.

Net weight	21 lbs. 12 oz.
Shortage on basis of 100 lbs. is	13 lbs. 12 oz.

Composition	Per cent.
Linseed oil	8.05
Water	0.47
White lead	91.48
Total	100.00

Station No. 178. Red Seal White Lead

From National Lead Co.

"Packages all marked"

Stated Gross weight	317 lbs.
Stated weight of keg	12 lbs.
Weight of keg as actually determined	19 lbs.
Shortage	5 lbs.

There is a shortage in weight for all these white leads. They should either be made full weight or the net weight added. The customs of giving gross weight for net in these pails may be old but it is not just to the purchaser.

Station No. 129. Bavarian White Lead (Improved.)

D. T. Weir White Lead Co., St. Louis, Mo.

Guarantee. "Weir's Bavarian White Lead (improved) is guaranteed to be as white and finely ground as any lead made. It is also guaranteed to wear 50 per cent longer than any "strictly pure white lead" or other make of lead. The greater bulk of Weir's Bavarian White Lead (Improved) gives 22 per cent increased spreading capacity, which added to the wonderful durability which it produces, makes it by far the most economical paint on the market. We will forfeit one hundred dollars ($100.00) to any charitable institution in St. Louis, if after comparative time test, Weir's Bavarian White Lead (Improved) does not outwear any white lead made."

Analysis of Pigment.	Per cent.
White lead	00.00
Lead sulphate	5.07
Zinc oxide	25.00
Barytes	69.70
Undetermined	0.23
Total	100.00

In a little booklet entitled "Points on Paint and Painting" by D. T. Weir White Lead Company, we find they do not claim Wier's Bavarian White Lead to be made from strictly pure White Lead. Here is what they say on page 21: "White Bavarian Lead is not strictly pure, perfectly pure or any other pure, but it is a combination of pigments ground in linseed oil to the usual white paste form. The words white lead are used as a descriptive term because they are designations used by the public for a white paste paint material." They do, however, endeavor to lead the public to believe that it is, in part, white lead, as is shown on page five of the same booklet which says: "The White Lead used in Wier's Bavarian White Lead is corroded by the old Dutch process, and is then pan-dried."

"This lead is then ground in the best linseed oil with other perfectly dry inert pigments which do not have the least effect on linseed oil. By this process all danger of damage to the linseed oil is removed, and we have left in Wier's Bavarian White Lead the most durable White Lead made."

There is, therefore, no mistake as to what the Company would have the consumer believe with regard to the composition of the paint, and they have the right, therefore, to assume that this product is in part, at least, white lead. Reference to the analysis given above shows that this product contains no white lead whatever. The Company are therefore, guilty of intentially misleading and deceiving the public in their statements as well as in the name which they have selected. A product of this type cannot be sold under the name of "White Lead" without subjecting the dealer to liability of prosecution for deception and fraud.

Station No. 179. Sublimed White Lead

Picher Lead Co., Joplin, Mo.

Approximate composition as stated by the manufacturers is as follows:—

Lead sulphate	75 per cent.
Lead oxide	20 per cent.
Zinc oxide	5 per cent.

The lead sulphate and lead oxide being apparently combined as a white oxysulphate. The zinc oxide is incidental to the manufacture.

Analysis of sample	Per cent.
Lead sulphate	75.02
Lead oxide	18.48
Zinc oxide	6.22
Silica & Alumina	0.28
	100.00

ANALYSIS OF MISCELLANEOUS WHITE LEADS.

Station No.	BRAND	Net Weight	White Lead	Lead Sulphate	Zinc Oxide	Barytes	Calcium Carbonate	Silica	Clay	Undetermined
10	Globe White Lead	13.5	9.98	....	12.00	76.28	....	1.10	.....	0.64
11	Gold Seal White Lead. Minn. Linseed Oil Paint Co.	15.4	64.73	....	3.60	30.43	....	0.76	.....	0.48
12	Park White Lead Park Lead Works	14.8	4.69	....	12.50	75.72	5.89	0.67	.....	0.53
24	American White Lead. Premium brand	15.0	3.34	....	8.96	72.35	4.52	....	10.83	
52	White Lead		54.69	....	17.38	25.57	....	....	.....	0.36
134	American Pure White Lead Chicago,	1 ℔ 14.2	0.00	3.29	6.90	89.81				
136	Mississippi White Lead	1℔ 14 oz.	10.69	....	20.03	69.28				
161	American White Lead	15 oz.	5.31	6.37	13.68	74.25	....	....	.....	0.39

None of the above products are entitled to be called White Lead. Only one bears the name of the company putting out the product. All must needs be labelled to show their composition before they can be sold, legally, in this state.

Station No. 131. "Selected" Zinc Oxide.

New Jersey Zinc Co., New York.

Composition	Per cent.
Lead sulphate	0.31
Zinc Oxide	99.69
Total	100.00

Station No. 133. XX Zinc Oxide.

New Jersey Zinc Co., New York.

Composition	Per cent.
Lead sulphate	0.03
Zinc sulphate	0.11
Zinc Oxide	99.86
Total	100.00

Station No. 130. Mineral Point Zinc Oxide.

Composition	Per cent.
Lead sulphate	4.22
Zinc sulphate	1.41
Zinc Oxide	94.37
Total	100.00

Station No. 132. Mineral Point Standard Zinc Oxide.

Composition	Per cent.
Lead sulphate	5.98
Zinc sulphate	0.61
Zinc Oxide	93.41
Total	100.00

ANALYSES OF MIXED PAINTS.

Station No. 62. Acme Household Paint—White.

Acme White Lead & Color Works, Detroit, Mich.

Station No. 116. New Era Paint—Outside White.

Acme White Lead & Color Works, Detroit, Mich.

"New Era Outside White is composed of pure, lead, zinc and refined linseed oil, is very heavy bodied and must be reduced to meet the requirements of the work upon which it is to be used."

Station No. 117. New Era Paint, Tint No. 44 (Gray.)

"A chemical analysis of this paint will prove our claim that it is the Best Paint That Can Be Made. The White and lighter tints will weigh heavier than darker shades and colors, as the latter contain a much larger percentage of coloring material, which necessarily weighs considerable less than the pure white. We invite comparison between this paint and any brand of strictly pure lead or Prepared Paint, as to durability, covering and working properties."

	No. 62	No. 116	No. 117
Net weight............	0℔ 14.9 oz.	8℔ 2 oz.	7℔ 7 oz.
Capacity of can..........	0.30 qts.	2.04 qts.	2.06 qts.
Contents................	0.26 qts.	2.00 qts.	1.97 qts.
	Per cent.	Per cent.	Per cent.
Pigment by weight....	28.3	67.4	58.3
Fluid portion by weight	71.7	32.6	41.7
	100.00	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent	Per cent.
Linseed oil..............	68.6	90.6	87.8
Turpentine dryer........	30.0	7.3	12.2
Water	1.4	2.1	0.0
	100.00	100.00	100.00

Analysis of Pigment.

	Per cent	Per cent	Per cent.
White Lead	00.00	58.76	9.11
Lead sulphate	00.00	2.22	45.06
Zinc oxide	99.80	33.92	43.77
Calcium carbonate		1.24	
Alumina		1.54	0.99
Silica		1.76	0.85
Magnesia		0.18	
Undetermined, color, etc.	0.20	0.38	0.22
	100.00	100.00	100.00

The tag attached to every can of this paint is somewhat misleading since the statements made thereon, would seem to be applicable, to the outside white and not to the shades.

Station No. 165. Armstrong's Mixed Paint—Outside White.

Armstrong's Paint & Varnish Works, Chicago.

"Guarantee. We guarantee our paint to be satisfactory in every way when applied according to directions on this label."

The basis of the paint in this can is composed of selected oxide of zinc, 65 per cent, pure carbonate of lead, 15 per cent, silex (or indestructible flint,) 20 per cent, together with the necessary coloring matter to produce the desired tint.

The liquid in this paint is composed of pure linseed oil, 92 per cent, oil dryer, 8 per cent.

Station No. 166. Armstrong's Mixed Paint, Tint No. 366.

Same statement on can as under No. 165.

	No. 165	No. 166
Net weight	7 lb 11 oz.	6 lb 0 oz.
Capacity of can	1.94 quarts	1.94 quarts
Contents	1.89 quarts	1.74 quarts
	Per cent	Per cent.
Pigment by weight	65.6	57.2
Fluid portion by weight	34.4	42.8
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	88.9	89.5
Dryer	9.3	8.6
Water	1.8	1.9
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	14.65	14.18
Lead sulphate	0.34	.27
Zinc oxide	63.42	63.27
Silica	20.91	20.14
Undetermined color, etc	0.68	2.14
	100.00	100.00

Station No. 106. Atlas Paint—House Colors.

Atlas Paint Manfg. Co., Minneapolis Minn.

Strictly Pure. Tint No. 10. (Light Green.)

"Unequalled for Fineness and Durability."

Station No. 125. Atlas Paint—House Colors.

Tint No. 10 (Light Green.)

"Our Strictly Pure Guarantee. We guarantee that this paint contains only those ingredients declared by law to constitute Pure Paint, viz., Pure White Lead (carbonate of lead,) Pure Oxide of Zinc, Pure Coloring matter ground in Pure Linseed Oil and thinned with Pure Turpentine and Pure Japan Dryer."

	No. 106	No. 125
Net weight	3℔ 8 oz.	3℔ 11 oz.
Capacity of can	1.05 quarts	1.06 quarts
Contents	99. quarts	1.06 quarts

	Per cent	Per cent.
Pigment by weight	54.1	54.8
Fluid portion by weight	45.9	45.2
	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent.
Linseed Oil	97.4	95.9
Turpentine Japan	1.0	2.7
Water	1.6	1.4
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	38.01	39.72
Lead sulphate	8.13	3.84
Zinc oxide	52.61	54.98
Color	1.25	1.46
	100.00	100.00

Station No. 41. "N. W." Mixed Paint—Outside White.

T. L. Blood & Co., St. Paul, Minn.

"Unexcelled for durability, fine finish and covering capacity."

"The pigment of the 'N. W.' paint is composed of carbonate of lead, oxide of zinc and colors, thinned with pure linseed oil and sufficient turpentine Japan and spirits of turpentine to insure general working qualities. No other materials enter into its composition."

"When properly applied we guarantee our 'N. W.' paint to give entire satisfaction as to durability, covering capacity and fine finish."

Station No. 86. "N. W." Mixed Paint, Tint No. 66.

Station No. 148. "N. W." Mixed Paint, Tint No. 21.

	No. 41	No. 86	No. 148
Net weight..............	3℔ 5 oz.	3℔ 14 oz.	6℔ 12 oz.
Capacity of can...........	1.03 qts.	1.03 qts.	2.03 qts.
Contents	.89 qts.	.98 qts.	1.92 qts.
	Per cent.	Per cent.	Per cent.
Pigment by weight...........	62.1	62.0	56.9
Fluid portion by weight......	37.9	38.0	43.1
	100.00	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.	Per cent.
Linseed oil..................	86.7	93.2	92.0
Turpentine dryer............	10.5	5.2	6.2
Water	2.8	1.6	1.8
	100.00	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.	Per cent.
White lead...............	*31.32	30.62	27.73
Lead sulphate............		3.14	2.39
Zinc oxide...............	68.14	65.96	57.12
Clay and Silica...........			7.74
Iron oxide and lamp black..			5.02
Undetermined, color, etc..	0.54	0.28	
	100.00	100.00	100.00

*Lead present calculated to white lead.

Sample No. 148 has a rather large per cent of ochre as color.

Station No. 122. Crown Cottage Colors—Outside White.

Bradley Vrooman & Co., Chicago.

"Unequalled for Fineness and Durability."

"We conform to the laws of the state of North Dakota by stating that Crown Cottage Colors Outside White is made as follows:

Pigment. Lead (sulphate) 60 per cent, zinc (oxide) 40 per cent.

Thinners. Linseed oil 90 per cent. Japan dryer and turpentine 10 per cent.

Station No. 121. Crown Cottage Colors, No. 300 Silver Gray. Guarantee for the base white.

Pigment. Lead (sulphate) 50 per cent, zinc (oxide) 50 per cent.

Thinners. Linseed oil 90 per cent., Japan dryer and turpentine 10 per cent.

	No. 122	No. 121
Net weight	15lb	14lb 5 oz.
Capacity of can	3.96 qts.	3.96 qts.
Contents	3.95 qts.	3.94 qts.

	Per cent.	Per cent.
Pigment by weight	57.0	55.9
Fluid portion by weight	43.0	44.1
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	90.5	88.6
*Dryer	9.3	*10.8
Water	0.2	0.6
	100.00	100.00

*Largely benzene.

Analysis of Pigment.

	Per cent.	Per cent.
White lead	0.0	0.0
*Lead sulphate	58.37	48.76
*Lead oxide	5.99	
Zinc oxide	35.24	48.31
Undetermined color, etc	0.40	2.93
	100.00	100.00

*Probably sublimed lead.

Station No. 142. Breinig's Lithogen Silicate Paint—Outside White.

Bridgeport Wood Finishing Co., New Milford, Conn.

Silex Lead and Zinc Paint.

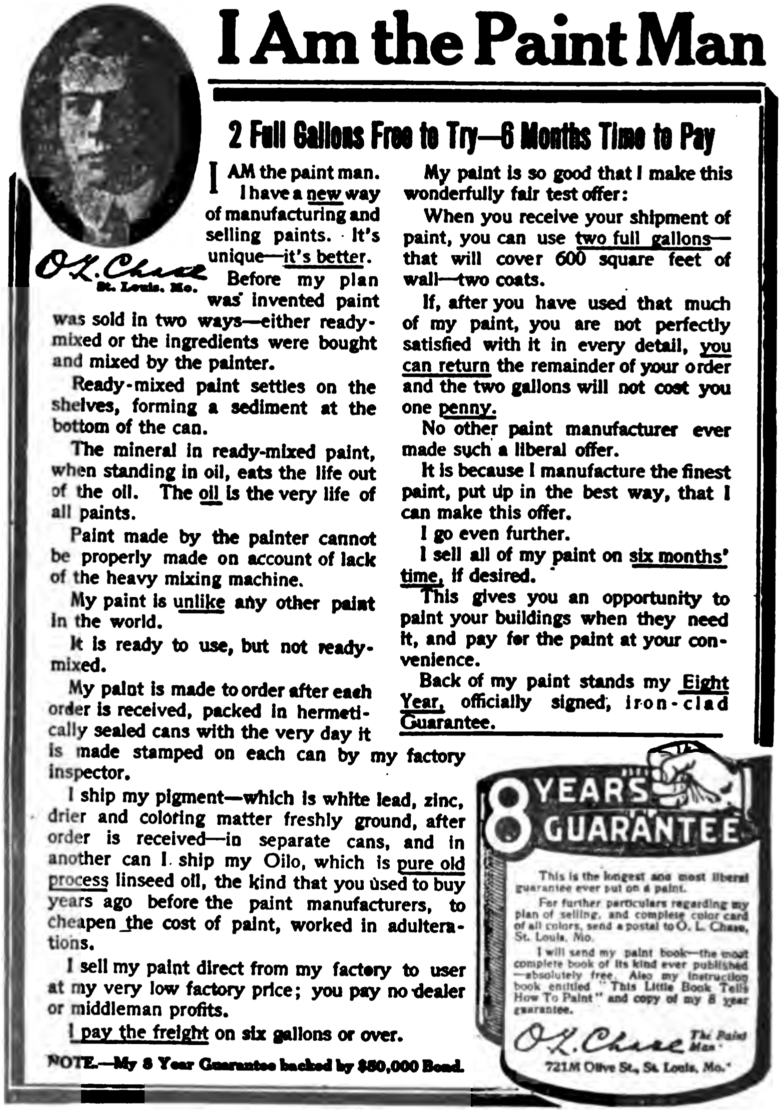
"Recommended for durability, body and fastness of color. Superior to white lead. Non-Poisonous, will not crack, peel or chalk off. Resists atmospheric action in any climate. Especially adapted for painting along the coast. Hardens into an elastic stone-like covering on stone, plaster and iron * * * * * * One gallon producing two gallons or more of paint ready for use, which will spread over more surface than the same quantity of white lead and linseed oil."

Net weight	5℔ 1 oz.
Capacity of can	1.05 qts.
Contents	.94 qts.

	Per cent.
Pigment by weight	82.5
Fluid portion by weight	17.5
	100.00

Analysis of Pigment.

White lead	33.88
Lead sulphate	0.17
Zinc oxide	32.09
Silica	33.18
Undetermined	0.68
	100.00



I Am the Paint Man

2 Full Gallons Free to Try—6 Months Time to Pay

O. L. Chase
St. Louis, Mo.

I AM the paint man. I have a new way of manufacturing and selling paints. It's unique—it's better. Before my plan was invented paint was sold in two ways—either ready-mixed or the ingredients were bought and mixed by the painter.

Ready-mixed paint settles on the shelves, forming a sediment at the bottom of the can.

The mineral in ready-mixed paint, when standing in oil, eats the life out of the oil. The oil is the very life of all paints.

Paint made by the painter cannot be properly made on account of lack of the heavy mixing machine.

My paint is unlike any other paint in the world.

It is ready to use, but not ready-mixed.

My paint is made to order after each order is received, packed in hermetically sealed cans with the very day it is made stamped on each can by my factory inspector.

I ship my pigment—which is white lead, zinc, drier and coloring matter freshly ground, after order is received—in separate cans, and in another can I ship my Oilo, which is pure old process linseed oil, the kind that you used to buy years ago before the paint manufacturers, to cheapen the cost of paint, worked in adulterations.

I sell my paint direct from my factory to user at my very low factory price; you pay no dealer or middleman profits.

I pay the freight on six gallons or over.

My paint is so good that I make this wonderfully fair test offer:

When you receive your shipment of paint, you can use two full gallons—that will cover 600 square feet of wall—two coats.

If, after you have used that much of my paint, you are not perfectly satisfied with it in every detail, you can return the remainder of your order and the two gallons will not cost you one penny.

No other paint manufacturer ever made such a liberal offer.

It is because I manufacture the finest paint, put up in the best way, that I can make this offer.

I go even further.

I sell all of my paint on six months' time, if desired.

This gives you an opportunity to paint your buildings when they need it, and pay for the paint at your convenience.

Back of my paint stands my Eight Year, officially signed, iron-clad Guarantee.

NOTE.—My 8 Year Guarantee backed by $50,000 Bond.

8 YEARS GUARANTEE

This is the longest and most liberal guarantee ever put on a paint.

For further particulars regarding my plan of selling, and complete color card of all colors, send a postal to O. L. Chase, St. Louis, Mo.

I will send my paint book—the most complete book of its kind ever published—absolutely free. Also my instruction book entitled "This Little Book Tells How To Paint" and copy of my 8 year guarantee.

O. L. Chase The Paint Man

721M Olive St., St. Louis, Mo.

The producers of Chase's paint specifically state that their mixed paint is white lead, zinc, drier and coloring matter freshly ground as is shown by a reference to the preceding advertisement, when in reality there is no white lead in the paint whatever.

In their directions for using the O. L. Chase "Made to Order" paint on page 10 they state: "It contains exactly the right proportions of everything needed—the exact amount of white lead to give opacity and body; the right proportion of zinc white to afford proper oil affinity, and greatest durability; the precise quantity of drier to produce the best results, and the exact amount of the purest linseed oil obtainable, to say nothing of the right quantity of the finest tinting colors." Surely then they would have their customers believe that the product they are selling them would have as its basis white lead.

There was purchased from this company one gallon of paint, put up in two separate receptacles; one for the pigment, the other containing the oil. In the can containing the pigment there was found 1.71 quarts and of oil, 1.70 quarts, or a total of 3.41 quarts. In other words then the gallon was .59 of a quart short, and when the two products were combined there was actually by weight 10 pounds and 13 ounces. Whereas a good paint should weigh approximately 16 pounds per gallon. Inasmuch as they charge $1.60 per gallon, is seems an exhorbitant price for the oil when the selling price of linseed oil is but forty cents a gallon. Thus in the oil itself there is furnished a nice profit of $1.20 to each forty cents expended for oil.

The pigment, as received, was found to be made up, by weight, of 75.6 per cent. solids, and 24.4 fluid. Or when you add the oil as received the relation of the pigment to the vehicle is as 52.4 to 47.6 per cent. This paint would therefore, be unusually thin, in fact as in the pigment, when received, there was already present as much fluid as is found in some paints and, of this fluid portion 24 per cent. is in the form of benzine, and nearly 21 per cent. occurs as water.

The analysis shows that the paint does not contain a trace of white lead; it does however contain of chalk and barytes 55.26 per cent., and the balance is mainly zinc oxide.

In the judgment of the writer this is one of the most misleading and deceptive paint propositions before the public.

In the following we give complete results of our examination of the sample of paint as purchased directly from the company.

Station No. 170. The O. L. Chase Strictly Pure House Paint, Tint No. 946.

O. L. Chase, The Paint Man, St. Louis, Mo.

"Guarantee. I guarantee the O. L. Chase Paint to be the best that money and brains can make. I guarantee the O. L. Chase Oilo to be absolutely pure old fashioned linseed oil. I guarantee both to give perfect satisfaction and to outlast any other paint. If not all I claim I will refund your money."

Station No. 171. The O. L. Chase Oilo.

	No. 170	No. 171
Capacity of can	1.95 qts.	1.95 qts.
Contents	1.71 qts.	1.70 qts.
Net weight	7 lb 8 oz.	3 lb 5 oz.

Sample received represents a low grade linseed oil.

	Per cent
Pigment by weight	75.6
Fluid portion by weight	24.4
	100.00

Analysis of fluid portion.

	Per cent.
Linseed oil	54.94
Benzine dryer	24.17
Water	20.89
	100.00

Analysis of Pigment.

	Per cent.
White lead	0.00
Lead sulphate	3.66
Zinc oxide	39.87
Calcium carbonate	33.78
Barytes	21.48
Color and undetermined	1.21
	100.00

The weight of the paint plus the oils is 10 ℔ 13 oz. The volume of the paint plus the oils is 3.41 qts., or a shortage of about 15 per cent per gallon.

The per cent of pigment in the mixture is	52.4
The per cent of vehicle in the mixture is	47.6
	100.00

The fluid portion of the mixture is composed of

	Per cent.
Linseed oil	84.0
Benzine dryer	8.6
Water	7.4
	100.0

Station No. 146. Devoe Lead & Zinc Paint—Outside White.

F. W. Devoe & Co., Chicago, Ill.

"Notice. These paints are strictly pure and are sold subject to chemical analysis.

Notice. These Paints are made only of Pure White Lead, Pure White Zinc, Pure Linseed Oil, Pure Turpentine Dryer, Pure Tinting Colors and Nothing Else.

Notice. These Paints are strictly full measure."

Station No. 147. Devoe Lead and Zinc Paint No. 694 Light Lead.

Same statement as under No. 146.

	No. 146	No. 147
Net weight	6℔ 11 oz.	6℔ 13 oz.
Capacity of can	2.00 qts.	2.00 qts.
Contents	1.86 qts.	1.90 qts.

	Per cent.	Per cent.
Pigment by weight	56.6	56.7
Fluid portion by weight	43.4	43.3
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	93.0	93.2
Turpentine dryer	6.4	6.2
Water	0.6	0.6
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	28.56	28.34
Lead sulphate	0.62	0.87
Zinc oxide	70.43	69.91
Undetermined, color, etc	0.39	0.88
	100.00	100.00

Station No. 159. Champion Ready Mixed Paints—Outside White.

Detroit White Lead Works, Detroit, Mich.

"This Paint is a mixture of white lead and zinc and we guarantee it to outwear Pure White Lead."

Station No. 169. Champion Ready Mixed Paints—Stone Color, No. 73.

Same statement as under No. 159.

Station No. 153. Detroit White Lead Works Liquid Paint, Gray B—15.

"We guarantee the paint in this can when used according to directions to be fully equal to any house paint on earth for spreading, covering and wearing qualities and we further guarantee it to outwear Strictly Pure White Lead used in the ordinary way twice over."

	No. 159	No. 169	No. 153
Net weight..............	3℔ 0 oz.	2℔ 14 oz.	3℔ 8 oz.
Capacity of can.........	1.03 qts.	1.00 qts.	1.03 qts.
Contents	.99 qts.	.90 qts	.95 qts.
Fluid portion by weight....	44.9	50.1	43.2
Pigment by weight.........	55.1	49.9	56.8
	100.00	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent	Per cent
Linseed oil........................	72.5	68.9	75.5
Benzine dryer	9.1	16.1	7.3
Water	18.4	15.0	17.2
	100.00	100.00	100.00

Analysis of Pigment.

	Per cent	Per cent	Per cent
White lead	0.00	21.73	26.80
Lead sulphate	.89	.85	4.70
Zinc oxide	53.86	47.89	46.67
Calcium carbonate	43.39	21.98	1.26
Magnesium carbonate	0.73		
Barytes			19.90
Clay & Silica	0.60	5.41	
Undetermined, color etc.	.53	2.14	0.67
	100.00	100.00	100.00

No. 159 and 169 bear statments guaranteeing the paints to be white lead and zinc when in realty there is no white lead in No. 159 at all, and in place of being white lead and zinc only there is present a large amount of calcium carbonate or chalk and other cheapening agents.

Station No. 49. Ruchter's Durable Paint for Building —White.

A. A. Eberson & Co., St. Louis, Baltimore.

No guarantee stated on label.

Net weight	4 lbs. 14 oz.
Capacity of can	1.06 quarts
Contents	.97 quarts
Pigment per cent	83.9
Fluid portion per cent	16.1
	100.00

Analysis of Pigment.

White lead	00.00
Zinc oxide	53.00
Calcium carbonate	45.90
Magnesium carbonate	1.01
Undetermined	0.09
	100.00

Station No. 55. Noxall Fast Color Paint—Outside White.

Enterprise Paint Mfg. Co., Chicago, Ill.

"Unequalled for fineness and durability."

Station No. 56. Perfecto Mixed Paint—Outside White.

Enterprise Paint Mfg. Co.,

No statement or guarantee given on label.

	No. 55	No. 56.
Net weight	3 lbs. 1 oz.	0 lbs. 11.3 oz.
Capacity of can	1.06 quarts	0.34 quarts
Contents weight per cent	.94 quarts	0.25 quarts
Pigment weight per cent	58.9	59.8
Fluid portion weight per cent	41.1	40.2
	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent
Linseed oil	55.0	52.0
Volatile oil	28.0	26.0
Water	17.0	22.0
	100.00	100.00

Analysis of Pigment.

	Per cent	Per cent
White lead	20.46	23.25
Lead sulphate	6.50	7.12
Zinc oxide	27.06	31.80
Calcium carbonate	29.23	28.44
Barium sulphate	13.64	9.18
Undetermined	3.11	0.23
	100.00	100.00

The above paints were the ones found on the market when the paint law went into force but have been largely replaced by the following—Republic brand.

Station No. 118. Republic Brand Prepared Paint—Outside White.

Enterprise Paint Mfg. Co., Chicago, Ill.

"This paint conforms to the North Dakota Paint Law by being labelled to contain the following ingredients:
Pigment.--Zinc Oxide 55 per cent, Sublimed Lead 45 per cent
Liquids.--Linseed Oil 90 per cent, Japan Dryer 10 per cent

Station No. 119. Republic Brand Prepared Paint—Tint No. 411.

"Guarantee. Pigment. Zinc Oxide 53 ½ per cent., Sublimed Lead 46 ½ per cent., together with the necessary coloring matter to produce the desired tint.
Liquids.--Linseed Oil 90 per cent, Japan Dryer 10 per cent.

	No. 118	No. 119
Net weight	15 lbs. 1 oz.	14 lbs. 8 oz.
Cpacity of Can	4.00 qts.	4.00 qts.
Contents	3.94 qts.	3.86 qts.
	Per cent	Per cent
Pigment by weight	59.2	58.6
Fluid portion by weight	40.8	41.4
	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent
Linseed oil	90.4	90.4
Japan dryer	9.5	9.6
Water	0.1	0.0
	100.00	100.00

Analysis of Pigment.

		Per cent		Per cent
Sublimed lead		45.36		46.83
Lead sulphate	33.46		35.56	
Lead oxide	9.63		8.93	
Zinc oxide	2.27		2.34	
Zinc Oxide		54.11		52.77
Undetermined, color, etc.		0.53		0.40
		100.00		100.00

Station No. 40. Gilt Edge House Paint—Inside White.

Farwell, Ozmun Kirk & Co., St. Paul, Minn.

"Strictly Pure."

"Gilt Edge House Paints are composed of pure carbonate of lead, oxide of zinc, pure linseed oil and enough turpentine and Japan to insure correct drying and working qualities. Our outside white contains only lead and zinc for pigment, and is strictly pure. The light tints and other shades contain as coloring matter, the best oxides, ochres and chemically prepared colors to be obtained."

The inside white bears a special label, "Don't use for outside work."

Station No. 112. Gilt Edge House Paint—Outside White

Same statement as under No. 40.

	No. 40.	No. 112.
Net weight	3 lbs. 0 oz.	8 lbs. 0 oz.
Capacity of Can	1.04 qts.	2.06 qts.
Contents	.99 qts.	2.05 qts.
	Per cent	Per cent
Pigment by weight	62.9	63.2
Fluid portion by weight	37.1	36.8
	100.00	100.00

Analysis of fluid portion.

	Per cent	Per cent.
Linseed oil	60.1	94.4
Turpentine dryer	39.9	4.5
Water	0.0	1.1
	100.00	100.00

Analysis of Pigment.

		Per cent	Per cent.
White lead		00.00	47.88
Lead sulphate		2.57	2.50
Zinc oxide		65.81	49.26
Lithophone		30.79	
Barium sulphate	20.20		
Zinc sulphide	6.13		
Zinc oxide	4.46		
Silica		0.28	
Undetermined		0.55	0.36
		100.00	100.00

Station No. 168. Albitc.

Farwell, Ozmun, Kirk & Co., St. Paul, Minn.

"Combination White Paint in Paste Form."

"The contents of this package consists of Sublimed White Lead 60 per cent., Standard Zinc Oxide 20 per cent., Barium Sulphate 20 per cent., ground in refined linseed oil. It will cover as well and wear longer than any strictly pure white lead made."

Station No. 177. Prepared Parian Paint—Outside White.

Farwell, Ozmun, Kirk & Co.

"Parian Outside White contains Pigment, White Lead Sublimed 40 per cent, Blanc Fixe 20 per cent. Liquid. Linseed oil 83 per cent., Naptha 11 per cent., White Japan 6 per cent."

	No. 168	No. 177
Net weight	0 lb 15 oz.	1 lb 14 oz.
Capacity of can		0.48 qts.
Contents		0.48 qts.

	Per cent.	Per cent.
Pigment by weight	91.0	65.0
Fluid portion by weight	9.0	35.0
	100.00	100.00

Analysis of fluid portion.

	Per cent.
Linseed oil	81.1
Volatile oil	17.8
Water	1.1
	100.00

Analysis of Pigment.

	Per cent.	Per cent.
Sublimed lead	58.73	36.85
Zinc oxide	21.49	42.03
Barium sulphate	19.78	21.12
	100.00	100.00

Station No. 158. Golden Rule Cottage Colors. Tint E 508.

St. Paul, Minn.

"Unequalled for fineness and durability."

Net weight	3 lb 1 oz.
Capacity of can	1.03 qts.
Contents	.91 qts.

	Per cent.
Pigment by weight	59.6
Fluid portion by weight	40.4
	100.00

Analysis of fluid portion.

	Per cent.
Linseed oil	63.4
Benzine dryer	16.1
Water	20.5
	100.00

Analysis of Pigment.

	Per cent.
White lead	00.00
Lead sulphate	11.58
Zinc oxide	38.69
Calcium carbonate	42.06
Barytes and Silica	7.06
Color	0.61
	100.00

This paint shows a high per cent. of fluid and 36 per cent. of this fluid is in the form of water and benzine adulterants, while one-half of the pigment is in the form of chalk and barytes but contains no white lead.

Station No. 123. Town and Country Ready Mixed Paint.—Outside White.

Harrison Bros. & Co., Philadelphia, Pa.

"Beware of adulterated oils and turpentine they will ruin any paint."

Station No. 114. Town and Country Ready Mixed Paint, Tint No. 74.

"Beware of adulterated oils and turpentine they will ruin any paint."

	No. 123	No. 114.
Net weight	3 lb 14 oz.	3 lb 10 oz.
Capacity of can	1.06 qts.	1.06 qts.
Contents	1.00 qts.	1.00 qts.
	Per cent.	Per cent.
Pigment by weight	62.7	57.1
Fluid portion by weight	37.3	42.9
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	81.0	70.3
Turpentine and Japan	9.0	11.1
Water	10.0	18.6
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	48.99	44.13
Lead sulphate	0.51	0.98
Zinc oxide	49.63	47.57
Calcium carbonate		1.21
Silica		3.70
Undetermined, color etc	0.87	2.41
	100.00	100.00

The paints as reported upon above have been replaced by the producers by paints of a composition like the following:

Station No. 180. Harrison's Town and Country Paint,—Outside White.

Harrison Bros., & Co., Inc. Philadelphia.

"One-half Gallon U. S. Standard Measure."

"The base of this paint is composed of 50 per cent. Basic Lead Carbonate (white lead,) 50 per cent Zinc Oxide. The thinning vehicle is composed of 88.34 per cent. linseed oil, 9.23 per cent Turpentine and Japan Drier, 2.43 per cent. water."

Station No. 181. Harrison Town and Country Paint, Tint No. 70.

Base 50 per cent. Basic Lead Carbonate (white lead,) 50 per cent. Zinc Oxide. Thinning vehicle 87.76 Linseed oil, 10.10 per cent. Turpentine and Japan Drier, 2.14 per cent. of water.

	No. 180	No. 181
Net weight	7℔ 12 oz.	15℔ 0 oz.
Capacity of can	2.07 qts.	4.12 qts.
Contents	1.99 qts.	3.92 qts.

	Per cent.	Per cent.
Pigment by weight	63.2	60.0
Fluid portion by weight	36.8	40.0
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	88.6	88.1
Turpentine and drier	8.8	9.8
Water	2.6	2.1
	100.00	100.00

Analysis of Pigment.

	Per cent	Per cent.
White lead	50.18	49.12
Lead sulphate	0.68	0.46
Zinc oxide	48.78	49.69
Undetermined, color, etc	0.36	0.73
	100.00	100.00

Station No. 43. Best Prepared Paint,—Outside White.

Heath & Milligan Mfg. Co., Chicago, Ill.

No guarantee given on label.

Station No. 108. Best Prepared Paint, Pearl Gray.

Station No. 160. Best Prepared Paint, French Grey.

"The white base in tints where white is used is composed of

White Lead	White lead	19.26	38.42
	Lead sulphide	19.16	
			Per cent.
Zinc oxide			46.58
Barium sulphate			10.00
Calcium carbonate			5.00
			100.00

The thinning vehicle is composed of

	Per cent.
Linseed oil	91.78
Turpentine and Japan drier	6.38
Water	1.84
	100.00

The tints are obtained by the use of necessary coloring matter.

March 1, 1906."

	No. 43	No. 108	No. 160
Net weight	4 ℔ 2 oz.	7 ℔ 13 oz.	4 ℔ 0 oz.
Capacity of can	1.06 qts.	2.06 qts.	1.06 qts.
Contents	1.01 qts.	1.98 qts.	1.05 qts.
	Per cent.	Per cent.	Per cent.
Pigment by weight	63.57	61.3	61.8
Fluid portion by weight	36.43	38.7	38.2
	100.00	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.	Per cent.
Linseed oil	89.55	90.9	90.6
*Turpentine and Japan drier	9.70	7.3	7.4
Water	0.75	1.8	2.0
	100.00	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.	Per cent.
White lead	*43.45	19.03	16.64
Lead sulphate		11.62	13.48
Zinc oxide	45.75	41.55	39.80
Calcium carbonate	10.39	8.40	10.68
Barium sulphate		17.62	18.93
Undetermined, color, etc	0.41	1.78	0.47
	100.00	100.00	100.00

Station No. 84. High Standard Liquid Paint,—Outside White.

The Lowe Bros., Dayton, Ohio.

Requisites for a High Standard House Paint. Covering Power, Spreading Capacity, Durability, Wearing evenly, Failing by gradual wear. Leaving a good surface for repainting.

The contents of this package will fulfill these requirements and will produce the best results obtainable, when fairly applied to a surface in a fit condition to receive paint.

Station No. 113. High Standard Liquid Paint,—Pure Gray.

	No. 84	No. 113
	Per cent	Per cent.
Net weight	3 lb 15 oz.	7 lb 9 oz.
Capacity of can	1.13 qts.	2.10 qts.
Contents	1.03 qts.	2.03 qts.

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*About equal parts turpentine and benzine.

*Includes both white and lead sulphate.

	Per cent	Per cent.
Pigment by weight	67.3	57.8
Fluid portion by weight	32.7	42.2
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	83.0	82.6
*Drier	16.8	17.2
Water	0.2	0.2
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	43.82	41.65
Lead sulphate	0.00	1.04
Zinc oxide	43.29	39.81
Calcium carbonate	2.80	5.81
*Silica	5.63	7.64
Alumina	1.58	0.98
Magnesia	2.18	2.44
Undetermined, color, etc	0.70	0.63
	100.00	100.00

Station No. 105. Tinted Gloss Paint,—Outside White.

John Lucas & Co., New York.

"Guaranteed Standard Measure,—Pure Oil."

"Beautiful, Durable, Reliable, Elastic."

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*Silica, Alumina and Magnesia probably in combination representing a natural earth product.

*About one part turpentine to two parts benzine.

Net weight	3℔ 4 oz.
Capacity of can	1.08 qts.
Contents	.93 qts.

	Per cent.
Pigment by weight	63.1
Fluid portion by weight	36.9
	100.00

Analysis of fluid portion.

Linseed oil	89.6
Drier	10.1
Water	0.3
	100.00

Analysis of Pigment.

White lead		21.56
Lead sulphate		1.09
Zinc oxide		49.25
Calcium carbonate		1.80
Clay and Magnesium Silicate		25.87
Silica	14.19	
Alumina	6.15	
Magnesia	3.70	
Comb. Water	1.83	
Undetermined		0.43
		100.00

Station No. 71. House Paint,—Outside White.

Minnesota Linseed Oil & Paint Co., Minneapolis, Minn.

Strictly Pure Paint consisting only of pure carbonate of lead. Pure oxide of zinc, pure tinting colors. Carefully mixed and thoroughly ground in our own pure linseed oil, pure turpentine and pure turpentine driers. Put up in full measure and sold subject to chemical analysis.

Station No. 135. House Paint. Tint No. 18.
Same statement as under No. 71.

	No. 71	No. 135.
Net weight	8 lb 2 oz.	16 lb 3 oz.
Capacity of can	2.11 qts.	4.06 qts.
Contents	2.05 qts.	4.01 qts
	Per cent	Per cent.
Pigment by weight	65.4	65.8
Fluid portion by weight	34.6	34.2
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
Linseed oil	95.6	90.4
Turpentine drier	4.4	9.4
Water	0.0	0.2
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	43.47	49.53
Lead sulphate		0.44
Zinc oxide	56.09	49.64
Undetermined, color, etc	0.44	0.39
	100.00	100.00

Station No. 66. Tower Brand Mixed Paint,—Outside White.

Montgomery, Ward & Co., Chicago, Ill.

Station No. 185. Tower Brand Mixed Paint,—Lead color, No. 37.

Montgomery, Ward & Co., Chicago, Ill.

	No. 66	No. 185
Net weight	3℔ 10 oz.	6℔ 14 oz.
Capacity of can	1.03 qts.	1.91 qts.
Contents	.95 qts.	1.82 qts.

	Per cent.	Per cent.
Pigment by weight	64.8	58.9
Fluid portion by weight	35.2	41.1
	100.00	100.00

Analysis of fluid portion.

	Per cent.	Per cent.
*Vegetable oil	84.5	80.2
Benzine drier	6.4	8.5
Water	9.1	11.3
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	00.00	00.00
Sublimed lead	80.28	00.00
Lead sulphate		39.26
Zinc oxide		34.20
Calcium carbonate		5.39
Barytes	19.08	19.90
Undetermined, color, etc	.64	1.25
	100.00	100.00

These paints are short measure, contain a large amount of water and benzine, no white lead and are about one-fourth chalk and barytes.

*Apparently a low grade linseed oil.

Station No. 57. Favorite House Paint,—Outside White.

John Masury & Son, New York and Chicago.

Label bears no guarantee.

Net weight	0℔ 14.3 oz.
Can capacity	0.27 quarts
Contents	0.22 quarts

	Per cent.
Pigment by weight	54.3
Fluid portion by weight	45.7
	100.00

Analysis of fluid portion.

	Per cent.
Linseed oil	97.9
Volatile oil	2.1
Water	0.0
	100.00

Analysis of Pigment.

White lead	00.00
Lead sulphate	4.29
Zinc oxide	60.94
Barytes	33.32
Silica	1.18
Undetermined	0.27
	100.00

Station No. 102. Horse Shoe Brand Prepared Paint. French Gray No. 867.

Mound City Paint & Color Co., St. Louis, Mo.

Guarantee. We guarantee this paint to be made wholly of Strictly Pure White Lead, Strictly Pure Oxide of Zinc.

Strictly Pure Linseed Oil, Strictly Pure Turpentine Japan, or the color necessary to produce this shade and that it contains no adulterating or cheapening material whatsoever. It is sold subject to chemical analysis.

Station No. 149. Horse Shoe Brand Prepared Paint,—Outside White.

Same statement as on above can.

	No. 102.	No. 149.
Net weight	3 lbs. 12 oz.	7 lbs. 12 oz.
Capacity of can,	1.05 quarts	2.03 quarts.
Contents	1.00 quarts	1.88 quarts.

	Per cent	Per cent.
Pigment by weight	60.0	64.3
Fluid portion by weight	40.0	35.7
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed oil	84.9	86.0
Turpentine Drier	12.8	13.7
Water	2.3	0.3

Analysis of Pigment.

	Per cent.	Per cent.
White lead	30.25	34.81
Lead Sulphate	5.07	5.41
Zinc oxide	64.07	59.21
Undetermined, color etc	0.61	0.57
	100.00	100.00

Station No. 174. Gold Medal Ready Mixed Paints. Tint No. 135.

Morrison Paint Co.

The address of the manufacturers is not given on this can. As shown in the analysis however 45 per cent. of the fluid is water and benzine and nearly one-half of the pigment is in the form of calcium carbonate and barytes and no white lead whatever.

Net weight	3 lbs. 8 oz.
Capacity of can	1.06 quarts.
Contents	1.00 quarts.

	Per cent.
Pigment by weight	60.7
Fluid portion by weight	39.3
	100.0

Analysis of Vehicle.

	Per cent.
Linseed oil	56.9
Benzine Drier	20.6
Water	22.5
	100.00

Analysis of Pigment.

	Per cent.
White Lead	00.00
Lead sulphate	18.13
Zinc oxide	34.04
Calcium carbonate	41.09
Barytes and silica	6.20
Color	0.54
	100.00

Station No. 88. N. B. & C. St. Paul Paint, Prepared Outside White.

Manufactured for Noyes Bros. & Cutler, St. Paul, Minn.

"One Quart."

Station No. 151. N. B. & C. St. Paul Paint Prepared Outside White.

"Half Gallon."

"In tints with a white base the base is composed of Lead Carbonate 25 per cent. Zinc Oxide (leaded) 50 per cent. Silicate of magnesia 12½ per cent Barium Sulphate 12⅛. The thinning vehicle is composed of Linseed Oil 85.88 per cent. water 2.73 per cent. turpentine and Japan Drier 11.3 per cent. The tints are obtained by the addition of the necessary coloring matter.

	No. 88.	No. 151.
Net weight	3 lbs. 11 oz.	7 lbs. 8 oz.
Capacity of can	1.01 quarts.	2.04 quarts.
Contents	.96 quarts.	1.95 quarts.

	Per cent.	Per cent.
Pigment by weight	62.6	63.0
Fluid portion by weight	37.4	37.0
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed oil	72.1	85.7
Turpentine Drier	17.6	*10.8
Water	10.3	3.5
	100.00	100.00

Analysis of Pigment.

		Per cent.	Per cent.
White Lead		33.57	30.91
Lead Sulphate		7.18	9.78
Zinc oxide		41.45	42.17
Barytes		6.45	6.27
Magnesium silicate		9.93	9.98
Silica	6.77		
Magnesium Oxide	3.16		
Combined water & undetermined		1.42	0.89
		100.00	100.00

It should be stated that paint like No. 151 is on sale in the state at the present time and not like No. 88.

Station No. 144. Patton's Sun-Proof Liquid Paint Outside White.

Patton Paint Co., Milwaukee, Wis.

"The base of this paint is White Lead 39 per cent. Zinc Oxide 50 per cent. Silica 11 per cent. The thinners Linseed Oil 91 per cent Turpentine Dryer 9 per cent.

Station No. 145. Patton's Sun Proof Liquid Paint, Light Gray.

"The white base of this paint where white is used is White Lead 39 per cent. Zinc Oxide 50 per cent. Silica 11 per cent. Together with the necessary coloring matter. The thinners Linseed Oil 90 per cent Turpentine and Dryers 10 per cent.

	No. 144	No. 145
Net weight	4 lbs. 4 oz.	3 lbs. 15 oz.
Capacity of can	1.05 qts.	1.05 qts.
Contents	.99 qts.	.99 qts.
	Per cent.	Per cent.
Pigment by weight	65.6	62.1
Fluid portion by weight	34.4	37.9
	100.00	100.00

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*Contains considerable benzine.

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed Oil	90.7	90.1
Turpentine & Dryer	9.2	9.8
Water	0.1	0.1
	100.0	100.0

Analysis of Pigment.

	Per cent.	Per cent.
White lead	40.23	39.31
Lead sulphate	2.55	2.60
Zinc oxide	47.75	47.52
Calcium carbonate	4.07	4.21
Silica	4.37	5.05
Magnesium carbonate	0.64	0.59
Undetermined, color etc.	0.39	0.72
	100.00	100.00

The manufacturer states that the carbonates and Silica are in the form of native silicates as used in the process of paint making. The product, however, cannot be considered as commercially pure.

Station No. 60. B. P. S. Paint. Outside Gloss White.

The Patterson Sargent Co., Cleveland, Ohio.

"Best Paint Sold."

"The B. P. S. Paint is not a patent or chemical paint but is composed only of pure Old Dutch Process carbonate of lead and oxide of zinc or the necessary coloring pigments, pure old process linseed oil and the very best Japan and contains no adulteration whatever."

Station No. 61. B. P. S. Paint. Outside Gloss White.

Same statement as above on can.

Station No. 152. B. P. S. Paint. Olive Gray 245.

"One Quart."

Same statement as above on can.

	No. 50	No. 61	No. 152.
Net weight	0. lbs 14 oz.	3 lbs. 13 oz.	3 lbs. 11 oz.
Capacity of can	0.30 qts.	1.06 qts.	1.06 qts.
Contents	0.23 qts.	.99 qts.	.97 qts.
	Per cent	Per cent.	Per cent.
Pigment by weight	63.4	63.2	54.9
Fluid portion by weight	36.6	36.8	45.1
	100.00	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.	Per cent.
Linseed oil	97.1	97.0	83.9
Japan Dryer	2.0	2.0	*14.9
Water	0.9	1.0	1.2
	100.00	100.00	100.00

Analysis of Pigment.

White lead	54.61	50.52	33.98
Lead sulphate	0.00	0.00	2.84
Zinc oxide	45.09	46.06	41.80
Silica	0.00	3.18	6.94
Calcium carbonate	.....	.....	12.14
Magnesium oxide & alumina	.....	.....	1.39
Undet., color, etc.	0.30	0.24	.91
	100.00	100.00	100.00

In 152 the presence of 21.38 per cent. of the pigment as silica, magnesia, alumina and undetermined matter would

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(*About 75 per cent. turpentine.)

not indicate that the product was wholly as represented, an ochre, employed to secure the desired tint. The iron constitutes only a part of the undetermined matter, and was exceedingly small, while the high per cent. of lime carbonate is sufficient to condemn the product as being in no-way a true ochre. Such a paint must be labelled to comply with the law.

PARKER'S PERFECT PAINT.

The "Parker's Perfect Paint" is very extensively advertised and, like the Chase Paint, emanates from St. Louis. The Company claims to produce paint made to order for each and every job. They lay a great deal of emphasis on the fact that paint should not be adulterated.

In a pamphlet entitled "The Paint that Parker Makes" they say: "You know that some flour has adulterations in it—that some flour will be mildewed—and that other flour will be clean, pure, wholesome and nutritious. And there is just as much difference in paint.

"But, of course, the dealer would like to have you believe his old slopped up mixture of cheap materials is just as good as the paint that is made from the purest and best materials and made by the most expert paint makers in the world.

"And Parker's Perfect is that paint—it's made from the best and freshest materials that it's posible to obtain; it has no adulteration in it—it's made to last, and stand up under the liberal selling plan under which it is sold."

They further say in the same pamphlet: "In the first place Parker's Perfect Paint is FRESH PAINT, MADE-TO-ORDER-PAINT, manufactured out of the purest, freshest materials under my own formula, ground and thoroughly assimilated in heavy grinding and mixing machines.

"Pure linseed oil is added to the pigment in correct proportion according to the number of coats for which the paint is to be used."

They further say on page 19: "Parker's Perfect White

Paint is made of absolutely pure ingredients, pure white lead, zinc white and other minerals, and pure old fashioned linseed oil, mixed in absolutely the right proportions to produce a perfect white, a lasting white.

It is made AFTER your order is received, MADE FOR YOU; therefore it is always FRESH when you receive it, and retains all its life, its lasting power."

In order that the reader may know just what their method of advertising is I re-produce a page from one of the leading magazines as follows:

I Sold the Paint

for that House for $\$13^{75}$

Let Me Tell You What the Paint for Your House Will Cost

Ten Years Guarantee
6 Months Time to Pay

FIRST let me tell you my price on the paint to do the work — not by the gallon, but for the entire job

Then let me send you all the paint you need freight prepaid Use it on your buildings—use it all

Then stand off and take a long look at it If the paint is as represented—if it is entirely satisfactory pay me the price I have put on it, either in cash or on 6 months time If the paint is *not* satisfactory, keep it *free*—without any cost whatever

Now I don't want you to pay me any money in advance I don't want you to send me a cent on deposit

I simply ask you to test the paint in the most liberal way you ever heard of

I have a large paint factory I have been making paint for many years In all my paint experience I have never seen a paint nor heard of a paint that was anywhere near as good as my Parker's Perfect Paint

That's the reason why I sell it on my Parker test plan

Now, most ready mixed paint that you buy at the store has water in it. It has to have. It wouldn't keep if it didn't

Another thing Mineral paint pigment and linseed oil fight each other when they are in a can together.

No canned paint is fresh paint—any more than canned corn can be fresh corn

I make my Parker's Perfect Paint especially for the job of painting to be done. It's *fresh* when you get it. For two-coat work I give you a certain body—for three-coat work another body—and so on,—so that the paint you get will be made especially to your order and for the exact number of coats that you want to put on.

Parker's Perfect Paint is made from pure material

The pigment is my own formula, containing pure white lead, zinc, coloring matter, drier, etc The linseed oil is the best that money can buy

Selling paint by the job—and not by the gallon—protects you

I tell you exactly how much it will cost to do your painting in any number of coats, and I guarantee you will have some paint left over

Don't guess at the amount of paint you need

In my new Paint Book I tell you just what I will charge you for the paint for your buildings—for the entire job—and I guarantee to furnish you at that price all the paint you need for the work

Now, no matter where you think of buying your paint you ought to write to me to find out how much a big paint manufacturer would charge you for the complete job It will post you on what you ought to pay

When you write I will send you my paint book "The Paint that Parker Makes" It tells the balance of this paint story and gives you a full line of colors to select from. My paint is guaranteed for ten years—and if you wish I will allow you six months time to pay for it

It's this way This is the fairest paint offer you ever heard of My paint is the best paint on the market You can take no risk in buying of me—in my way I leave it all in your hands to decide

If I didn't know my paint to be good surely I would not dare to sell it this way It's reasonable to believe that I *must* be making the best paint in the world to make such an offer as this—now isn't that so?

Write for my Paint book at once—today.

This offer, you see, will crowd my factory to its utmost So you should write for the paint book without delay Address

The President, Parker Perfect Paint Co.,
501 S. SEVENTH ST., ST. LOUIS, MO

The reader will note that they emphasize the fact that Parker's Perfect Paint is made from pure materials. They specifically say in this advertisement: "The pigment is my own formula, containing pure white lead, zinc, coloring matter, dryer, etc. The linseed oil is the best that money can buy."

Our analysis for this product is shown in the following:

Station No. 167. "Made for You" House Paint, Tint No. 540.

The Parker Perfect Paint Co., St. Louis, Mo.

Net weight	9℔ 9 oz.
Capacity of can	3.37 qts.
Contents	2.42 qt.s

	Per cent.
Pigment by weight	67.10
Fluid portion by weight	32.90
	100.00

Analysis of Vehicle.

	Per cent.
*Linseed oil	83.9
Benzine dryer	4.3
Water	11.8
	100.00

Analysis of Pigment.

	Per cent.
White Lead	00.00
Lead sulphate	4.73
Zinc oxide	24.34
Calcium carbonate	4.47
Barium sulphate	66.26
Undetermined, color, etc	0.20
	100.00

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*A very poor grade of oil.

In the first place the size of can, like that of all catalogue houses is an odd one; instead of being a normal one holding full four quarts the capacity of the can is in reality 3.37 quarts. One has a right to infer that he is purchasing a paint made of pure white lead, zinc, coloring matter, etc. Now unless "etc." is to be considered as an essential constituent in the paint, the statements made by the manufacturer in both his advertisement and the pamphlet are absolutely false and misleading. They are apparently intended to deceive the public. For, in reality, there is no white lead present, zinc oxide constitutes but one-fourth of the pigment, while two-thirds of this product is barytes costing not to exceed three-fourths of a cent per pound. The dryer is benzine, and the fluid portion contains 11.8 per cent. of added water. In other words, we should say from beginning to end this is another of the big frauds in the paint industry, and the public have a right to know of the character of such goods, and the manufacturer should be prosecuted for the false claims which have been set up.

Station No. 175. Ajax Prepared Paint. Outside White.

Peninsular Paint & Varnish Co., Detroit, Mich.

"Durable Economical."

Net weight	7℔ 6 oz.
Capacity of can	2.06 qt.s
Contents	2.03 qts.
	100.00

	Per cent.
Pigment by weight	61.5
Fluid portion by weight	38.5
	100.00

Analysis of Vehicle.

	Per cent.
Linseed oil	79.5
Benzine dryer	11.2
Water	9.3
	100.00

Analysis of Pigment.

	Per cent.
White lead	25.94
Lead sulphate	11.39
Zinc oxide	41.17
Calcium carbonate	9.58
Barytes and silica	11.01
Undetermined,	0.91
	100.00

Station No. 9. Peoples' Prepared Paint.

Outside white ready mixed for use. Manufacturer not given.

Net weight	13.5 oz.
Capacity of can	0.30 qts.
Contents	0.23 qts.

Fluid portion not pure linseed oil.

Analysis of Pigment.

	Per cent.
Lead calculated as white lead	2.27
Zinc oxide	44.44
Calcium carbonate	11.54
Gypsum	40.62
Silica, etc.	1.13
	100.00

Station No. 173. **Pitkin's Premium Paint, Light Stone Gray, No. 914.**

Geo. W. Pitkin, Co., Chicago.

"We guarantee the contents of this package, when used according to directions, under proper conditions, to wear longer than any mixture of lead and oil and not to chalk, crack, or peel off. If it fails to be as we represent, we will furnish new goods to repaint free of charge."

Net weight	5℔ 12 oz.
Capacity of can	1.95 qts.
Contents	1.86 qts.

	Per cent.
Pigment by weight	51.8
Fluid portion by weight	48.2
	100.00

Analysis of Vehicle.

	Per cent.
Linseed oil	63.9
*Dryer	20.4
Water	15.7
	100.00

Analysis of Pigment.

White lead	00.00
Lead sulphate	1.30
Zinc oxide	70.68
Calcium carbonate	1.07
Silica	25.03
Color and undetermined	1.92
	100.00

*About two-thirds benzine.

Station No. 154. Diamond Brand Ready Mixed Paint,—Outside White.

The T. M. Roberts Supply Co., Minneapolis, Minn.

"First Quality."

Station No. 155. Diamond Brand Ready Mixed Paints,

	No. 154	No. 155
Net weight	5℔ 11 oz.	6℔ 3 oz.
Capacity of can	1.95 qts.	1.95 qts.
Contents	1.75 qts.	1.92 qts.
	Per cent.	Per cent.
Pigment by weight	55.1	54.6
Fluid portion by weight	44.9	45.4
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
*Linseed oil	57.2	54.4
Benzine dryer	26.7	28.9
Water	16.1	16.7
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	0.00	0.00
Lead sulphate	3.82	3.11
Zinc oxide	27.49	24.67
Calcium carbonate	45.38	40.07
Barytes	22.80	22.10
Clay and Silica		7.26
Undetermined, color, etc	0.51	2.79
	100.00	100.00

*Not first grade oil.

Not only is there short measure but the proportion of fluid to solids is exceptionally large and nearly one-half of the fluid is water and benzine and about 70 per cent. of the pigment is lime, barytes and clay. The paint is one of the most inferior examined.

Station No. 59. Green Seal House Paint,—Outside White.

Name of manufacturer not given. Can bears no guarantee.

Station No. 60. Lion Brand Mixed Paint,—Outside White.

St. Paul White Lead Co., St. Paul, Minn

"For body this paint is unequalled. Its durability guaranteed."

"When properly applied, we guarantee Lion Brand paint to give satisfaction as to covering capacity, durability and finish."

	No. 59	No. 60
Net weight	3℔ 8 oz.	7℔ 0 oz.
Capacity of can	1.02 qts.	2.04 qts
Contents	.95 pt.	1.94 qts.
	100.00	100.00
	Per cent.	Per cent.
Pigment by weight	60.8	61.2
Fluid portion by weight	39.2	38.8
	100.00	100.00

Analysis of fluid portion.

	Per cent. No. 59	Per cent. No. 60
Vegetable oil	91.8	92.6
Volatile oil	4.9	4.1
Water	3.3	3.3
	100.00	100.00

Analysis of Pigment.

	Per cent. No. 59	Per cent. No. 60
White lead	21.53	20.65
Lead sulphate	8.03	7.76
Zinc oxide	39.13	41.27
Calcium carbonate	11.97	10.98
Barium sulphate	16.12	15.84
Silica and alumina (calculated as clay)	3.08	3.16
Undetermined	0.14	0.34
	100.00	100.00

StationNo. 127. Lion Brand Mixed Paint, Tint No. 42.
St. Paul White Lead Co., St. Paul, Minn.

"For body this paint is unequalled. Its durability is guaranteed. It has a fine gloss surface."

"Lion Brand Paint is a perfectly pure paint, composed only of pure Old Dutch Process Carbonate of Lead, Oxide of Zinc, or the necessary coloring pigments. Pure Old Process Linseed Oil and the very best dryer, and contains no adulteration whatever."

Station No. 176. Lion Brand Mixed Paint.—Outside White.

	No. 127	No. 176
Net weight	7 lb 5 oz.	8 lb 4 oz.
Capacity of can	2.06 qts.	2.06 qts.
Contents	1.96 qts.	2.01 qts.

	No. 127	No. 176
Pigment by weight	59.9	63.8
Fluid portion by weight	40.1	36.2
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed oil	93.4	91.9
*Dryer	6.4	7.0
Water	0.2	1.1
	100.00	100.00

*About two-thirds turpentine and one-third benzine.

Analysis of Pigment.

•	Per cent.	Per cent.
White lead	43.09	49.47
Lead sulphate	2.13	0.12
Zinc oxide	54.48	50.18
Undetermined, color, etc	0.30	0.23
	100.00	100.00

The company claim to have purchased the drier for a pure turpentine product and guarantee that this shall be true of their paints.

Station No. 87. S. W. P. Paint, Gloss White for Outside Use.

The Sherwin Williams Co.,

Guarantee. "We guarantee that this paint when properly used, will not crack, flake or chalk off, and will cover more surface, work better, wear longer and permanently look better than other paints including pure lead and oil.

We hereby agree to forfeit the value of the paint and the cost of applying it, if in any instance it is not found as above represented."

Station No. 109. S. W. P. Paint, Tint No. 351.

Same guarantee as above.

Station No. 128. S. W. P. Paint, Tint No. 484 (dark green.)

	No. 87	No. 109	No. 128
Net weight	8 lb 1 oz.	6 lb 12 oz.	4 lb 1 oz.
Capacity of can	2.04 qts.	2.04 qts.	1.03 qts.
Contents	2.00 qts.	1.98 qts.	.99 qts.
	Per cent.	Per cent.	Per cent.
Pigment by weight	62.6	54.9	63.0
Fluid portion by weight	37.4	45.1	37.0
	100.00	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.	Per cent.
Linseed oil	86.0	84.7	87.2
Turpentine drier	12.6	13.8	17.5
Water	1.4	1.5	4.3
	100.00	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.	Per cent.
White lead	44.08	27.29	Consists of color precipitated on an inert base.
Lead sulphate	4.62	4.39	
Zinc oxide	41.41	50.94	
Calcium carbonate	4.59	7.10	
Magnesium silicate	5.30	6.94	
Color		3.34	
	100.00	100.00	

Station No. 38. Monarch Mixed Paint,—Outside White.

Senour Manufacturing Co., Chicago, Ill.

Guarantee. The contents of this package is composed of linseed oil, turpentine, lead and zinc, and we guarantee it to be an absolutely pure paint, free from benzine, water or alkalies of any kind and to give satisfaction in every instance where directions are followed.

Station No. 137. Monarch Mixed Paint,—Outside White.

100 PER CENT PURE. Guarantee same as No. 140.

	No. 38	No. 137
Net weight	0 ℔ 14.2 oz.	7 ℔ 0 oz.
Capacity of can	0.30 qts.	2.06 qts.
Contents	.24 qt.	1.95 qts.

	Per cent.	Per cent.
Pigment by weight	62.8	58.7
Fluid portion by weight	37.2	41.3
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed oil	77.9	93.1
Turpentine drier	22.1	6.8
Water	0.0	0.1
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	18.84	28.17
Lead sulphate		0.32
Zinc oxide	80.45	71.24
Undetermined	0.71	0.27
	100.00	100.00

Station No. 140. Monarch Mixed Paint, Light Drab, No. 504.

100 PER CENT PURE. Senour Mfg. Co., Chicago, Ill.

Guarantee. "We guarantee our Monarch Paint (excepting a few dark shades that cannot be prepared from lead and zinc alone) to be composed of Pure White Lead, Pure Oxide of Zinc, Pure Linseed Oil, Pure Color and Turpentine Drier; to be free from benzine, water or alkalies and to give satisfaction in every instance where directions are followed.

Station No. 172. Monarch Mixed Paint, Olive Gray, No. 544.

100 PER CENT PURE. Guarantee same as No. 140.

	No. 140	No. 172
Net weight	6℔ 6 oz.	3℔ 7 oz.
Capacity of can	2.06 qts.	1.03 qts.
Contents	1.93 qts.	.96 qts.
	100.00	100.00

	Per cent.	Per cent.
Pigment by weight	56.6	55.4
Fluid portion by weight	43.4	44.6
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
Linseed oil	92.9	91.9
Turpentine drier	7.0	7.8
Water	0.1	0.3
	100.00	100.00

Analysis of Pigment.

		Per cent.	Per cent.
White lead		26.57	39.11
Lead sulphate		0.78	0.39
Zinc oxide		62.34	57.88
Color		10.31	2.62
Clay and Silica	5.56		
Iron oxide	3.02		
Carbon and undetermined	1.73		
		100.00	100.00

The Senour Co., through its president, recently gave notice that all paint from their house would be in strict conformity with the North Dakota paint law and would thereafter be made on a basis of 50 per cent. white lead and 50 per cent. zinc oxide and pure colors.

Station No. 48. Seroco Ready Mixed Paint—Outside White.

Seroco Paint Mfg. Co., Chicago, Ill.

Obtained from Sears, Roebuck & Co., Chicago.

"We guarantee our paint to wear for five years if the directions (given on label) are carefully followed."

Station No. 183. Seroco Ready Mixed Paint, Tint No. 201, (Gray.)

"We guarantee our mixed paints to wear five years if the directions are carefully followed."

	No. 48	No. 183
Net weight	3 lb 2 oz.	5 lb 10 oz.
Capacity of can	1.01 qts.	1.95 qts.
Contents	.96 qt.	1.70 qts.

	Per cent.	Per cent.
Pigment by weight	63.1	57.3
Fluid portion by weight	36.9	42.2
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
*Vegetable oil	72.2	77.9
Benzine drier	3.8	7.6
Water	24.0	14.5
	100.00	100.00

*Apparently low grade linseed oil.

Analysis of Pigment.

	Per cent.	Per cent.
*White lead	13.85	0.00
Lead sulphate		14.23
Zinc oxide	34.88	37.57
Calcium carbonate	26.84	41.70
Barytes and Silica	23.10	6.10
Undetermined, color, etc	1.33	0.40
	100.00	100.00

Station No. 63. Stearn's Paint,—Outside White.

Made and guaranteed by Stearns Paint Mfg. Co., Davenport, Iowa.

We guarantee the Stearns Anchor Brand Paint to be made of the following material, either carbonate of lead and zinc white, or such coloring and pigment as we deem necessary to produce desired shades, finely ground and tested raw linseed oil, turpentine and a very slight proportion of coach Japan and we hereby guarantee to pay $100 in gold in any case where the contrary can be proven.

Net weight	3℔ 15 oz.
Capacity of can	1.04 qts.
Contents	.98 qts.

	Per cent.
Pigment by weight	63.8
Fluid portion by weight	36.2
	100.00

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*Lead calculated to white lead.

Analysis of Pigment.

	Per cent.
White lead	38.73
Lead sulphate	3.89
Zinc oxide	56.75
Undetermined,	0.63
	100.00

Station No. 150. Gold Medal Mixed Paint, Tint W-17 (blue.)

F. W. Woolworth & Co.

"This paint is suitable for inside or outside work. The colors are always uniform and in covering and wearing capacity it is unexcelled."

The contents of this package is as follows:

Vehicle. Linseed oil, 63 per cent., Japan drier 24 per cent., Water, 13 per cent.

Pigments. Leaded Zinc, 48 per cent.,Calcium Carbonate, 42 per cent., Barytes, 10 per cent. Together with the necessary coloring matter to produce the desired tint.

Net weight	0lb 14.5 oz.
Capacity of can	.33 qts.
Contents	.28 qts.

	Per cent
Pigment by weight	57.0
Fluid portion by weight	43.0
	100.00

Analysis of Vehicle.

	Per cent.
Linseed oil	60.4
Benzine drier	25.7
Water	13.9
	100.00

Analysis of Vehicle.

	Per cent.
Linseed oil	91.8
Volatile oil	5.4
Water	2.8
	100.00

Analysis of Pigment.

	Per cent.
White lead	0.00
Lead sulphate	17.77
Zinc oxide	33.58
Calcium carbonate	39.88
Barium sulphate	6.40
*Color	2.37
	100.00

The above paint is an exceedingly inferior product in its physical make up as well as in composition.

Station No. 67. Star Brand Mixed Paint,—Outside White.

United States Paint Co., Chicago Ill,

Sample bought from Montgomery Ward & Co.

Station No. 184. Star Brand Mixed Paint, Tint 37, Lead Color.

	No. 67	No. 184
Net weight	3lb 3 oz.	6lb 4 oz.
Capacity of can	1.05 qts.	1.94 qts.
Contents	1.01 qts.	1.76 qts.

*Largely organic, soluble in petroleum ether.

	Per cent.	Per cent.
Pigment by weight	55.4	59.2
Fluid portion by weight	44.6	40.8
	100.00	100.00

Analysis of Vehicle.

	Per cent.	Per cent.
*Vegetable oil	64.5	79.5
Benzine drier	17.5	6.8
Water	18.0	13.7
	100.00	100.00

Analysis of Pigment.

	Per cent.	Per cent.
White lead	15.24	0.00
Lead sulphate	3.77	26.07
Zinc oxide	39.25	24.01
Calcium carbonate	28.45	40.97
Magnesium carbonate	3.15	
Barium sulphate	8.55	7.66
Silica	0.98	
Undetermined, color, etc	0.61	1.29
	100.00	100.00

Letters addressed to the United States Paint Co., Chicago, are returned to the writer showing that no such firm is known to the postal authorities. The above paints are very similar to the others purchased through Montgomery Ward & Co.

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*Apparently a very low grade of linseed oil.

Table showing contents per gallon and per cent. of shortage by volume.

Street No.	BRAND OF PAINT	Per Cent Vehicle	Pounds per Gallon	% Shortage of Contents	% excess vol. of contents
62	Acme Household Paint..............white	71.7	14.14	....	4.0
116	New Era Paint.....................white	32.6	16.4	....	....
117	New Era Paint.....................tint	41.7	14.14	1.5	....
165	Armstrong's Mixed Paint...........white	34.4	15.6	5.5	....
166	Armstrong's Mixed Paint.............tint	42.8	12.0	13.0	....
106	Atlas Paint..........................tint	45.9	14.0	1.0	....
125	Atlas Paint..........................tint	45.2	14.12	....	6.0
41	"N. W." Mixed Paint..............white	37.9	13.4	11.0	....
86	"N. W." Mixed Paint................tint	38.0	15.8	2.0	....
148	"N. W." Mixed Paint................tint	43.1	13.8	4.0	....
122	Crown Cottage Colors...............white	43:0	15.0	1.2	....
121	Crown Cottage Colors.................tint	44.1	14.5	1.5	....
142	Breinig's L. S. Paint...............white	17.5	20.4	6.0	....
170	O. L. Chase..........................tint	47.6	10.13	14.8	....
159	Champion Ready Mixed Paint........white	44.9	12.0	1.0	....
169	Champion Ready Mixed Paint..........tint	50.1	11.8	10.0	....
153	Detroit W. L. W's. Liquid Paint........tint	43.2	14.0	5.0	....
146	Devoe's Lead and Zinc Paint.........white	43.4	13.6	7.0	....
147	Devoe's Lead and Zinc Paint..........tint	43.3	13.10	5.0	....
49	Ruchter's Durable Paint.............white	16.1	19.8	3.0	....
55	Noxall Mixed Paint..................white	41.1	12.4	6.0	....
56	Perfecto Mixed Paint................white	40.2	11.5	....	....
118	Republic Brand Mixed Paint..........white	40.8	15.1	1.5	....
119	Republic Brand Mixed Paint............tint	41.4	14.8	3.5	....
40	Gilt Edge House Paint,........Inside White	37.1	12.0	1.0	....
112	Gilt Edge House Paint........Outside White	36.8	16.0	....	2.5
177	Prepared Parian Paint...............white	35.0	15.0	4.0	....
158	Golden Rule Paint....................tint	40.4	12.40	9.0	....
123	Town & Country Mixed Paint........white	37.3	15.8	....	....
114	Town & Country Mixed Paint..........tint	42.9	14.8	....	....
180	Town & Country Mixed Paint........white	36.8	15.8	0.5	....
181	Town & Country Mixed Paint..........tint	40.0	15.0	2.0	....
43	Best Prepared Paint.................white	36.4	16.8	....	1.0
108	Best Prepared Paint...................tint	38.7	15.10	1.0	....
160	Best Prepared Paint...................tint	38.2	16.0	....	5.0
84	High Standard Liquid Paint..........white	32.7	15.12	....	3.0
113	High Standard Liquid Paint............tint	42.2	15.2	....	1.5
105	Tinted Gloss Paint..................white	36.9	13.0	7.0	....
71	House Paint—Minnesota.............white	34.6	16.4	....	2.5
135	House Paint—Minnesota...............tint	34.2	16.3	....	0.2
66	Tower Brand Mixed Paint............white	35.2	14.8	5.0	....
185	Tower Brand Mixed Paint..............tint	41.1	13.12	9.0	....
57	Favorite House Paint................white	45.7	14.5	12.0	....
102	Horse Shoe Prepared Paint............tint	40.0	14.12	....	....
149	Horse Shoe Prepared Paint..........white	35.7	15.8	6.0	....

Street No.	BRAND OF PAINT	Per Cent Vehicle	Pounds per Gallon	% Shortage of Contents	% excess vol. of contents
174	Gold Medal Mixed Paint...............tint	39.3	14.0	....	....
88	"N. B. & C." St. Paul Paint........white	37.4	14.12	4.0	....
151	"N. B. & C." St. Paul Paint........white	37.0	15.0	2.5	....
144	Patton's Sun Proof Paint............white	34.4	17.0	1.0	....
145	Patton's Sun Proof Paint..............tint	37.9	15.12	1.0	....
50	B. P. S. Paint.......................white	36.6	14.0	12.0	....
61	B. P. S. Paint......................white	36.8	15.4	1.0	....
152	B. P. S. Paint........................tint	45.1	14.12	3.0	....
167	"Made for You" Paint..............tint	32.9	9.9	39.5	....
175	Ajax Brand.........................white	38.5	14.12	....	1.5
9	Peoples Paint.......................white	....	13.8	8.0	....
173	Pitkin's Premium Paint................tint	48.2	11.8	7.0	....
154	Diamond Brand Mixed Paint.........white	44.9	11.6	2.5	....
155	Diamond Brand Mixed Paint...........tint	45.4	12.6	4.0	....
59	Green Seal House Paint..............white	39.2	14.0	5.0	....
60	Lion Brand Mixed Paint............white	38.8	14.0	3.0	....
176	Lion Brand Mixed Paint.............white	36.2	16.8	....	0.5
127	Lion Brand Mixed Paint..............tint	40.1	14.10	2.0	....
87	Sherwin Williams Paint.............white	37.4	16.2	....	....
109	Sherwin Williams Paint................tint	45.1	13.8	1.0	....
38	Monarch Brand Mixed Paint....Inside white	37.2	14.3	4.0	....
137	Monarch Brand Mixed Paint..........white	41.3	14.0	2.5	....
140	Monarch Brand Mixed Paint............tint	43.4	12.12	3.5	....
172	Monarch Brand Mixed Paint..........tint	44.6	13.12	4.0	....
48	Seroco Brand Mixed Paint............white	36.9	12.8	4.0	....
183	Seroco Brand Mixed Paint............tint	42.2	11.4	15.0	....
67	Star Brand Mixed Paint..............white	44.6	12.12	....	1.0
184	Star Brand Mixed Paint..............tint	40.7	12.8	12.0	....
150	Gold Medal Mixed Paint..............tint	43.0	10.14	15.0	....

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